SPRINGER
REFERENCE

C. P. Khare

Indian Medicinal Plants

An Illustrated Dictionary

Springer

Indian Medicinal Plants

C.P. Khare (Ed.)

Indian Medicinal Plants

An Illustrated Dictionary

With 215 Pictures of Crude Herbs

Springer

Author
C.P. Khare
B-1/211, Janak Puri
New Delhi-110 058
India
chandrma_khare@yahoo.com

Library of Congress Control Number: 2007922446

ISBN: 978-0-387-70637-5 Springer-Verlag Berlin/Heidelberg

springer.com

Printed on acid-free paper SPIN: 11979302 2109 — 5 4 3 2 1 0

Dedicated to
the distinguished scientist

Dr. A. P. J. Adbul Kalam

who revived the glory of
Indian medicinal and aromatic plants
in the Rashtrapati Bhawan.

Guiding Factors

First of all, let me acknowledge with gratitude the contribution of the following reference works which synchronised the synonyms and medicinal properties of Indian medicinal plants:

- *A Catalogue of Indian Synonyms of the Medicinal Plants of India* by Moodeen Sheriff (1869). (The first exhaustive compilation of synonyms of Indian medicinal plants in 12 regional languages, besides Latin and English).
- *Indian Medicinal Plants* by Lt. Col. K.R. Kirtikar and Major B.D. Basu (1918).
- *Glossary of Indian Medicinal Plants* by Col. Sir Ram Nath Chopra et al. (*CSIR*, 1956).
- *Useful Plants of India* (*CSIR*, 1986; based on *The Wealth of India* series, Vol. I 1948, Vol. XI 1976).
- *Dictionary of Indian Medicinal Plants* by Akhtar Husain et al. (CIMAP, 1992).

Based on this legacy, *Indian Medicinal Plants. An Illustrated Dictionary* is aimed at bringing out an updated Active Study Dictionary of plant sources of Indian medicine, as a companion volume of my earlier book *Encyclopedia of Indian Medicinal Plants/Indian Herbal Remedies*, published by Springer.

Ayurvedic synonyms have been selected from the following sources:

- *The Ayurvedic Pharmacopoeia of India* (Vol. I to IV).
- *Standard Nomenclature of Ayurvedic Medicinal Plants* (*CCRAS*, 1999).
- *Medicinal Plants used in Ayurveda* (Rashtriya Ayurveda Vidyapeeth/ National Academy of Ayurveda, 1998).
- *Plants of Sharangadhara Samhita* by Prof. K.C. Chunekar and Dr. K. Pondel (National Academy of Ayurveda, 1999).

- *Plants of Bhava Prakash* by Prof. K.C. Chunekar and Dr. N.P. Hota (National Academy of Ayurveda, 1998).
- Central Council for Research in Ayurveda and Siddha (*CCRAS*). Published literature.
- *Dravyagun Vigyaan*, Vol. II (Hindi) by Dr. Priyavrata Sharma (1991).

Unani synonyms have been selected from the following sources:

- *The National Formulary of Unani Medicine.*
- Central Council for Research in Unani Medicine (*CCRUM*). Published literature.
- *Unani Dravyagunaadarsh* (Hindi) by Daljit Singh (Ayurvedic and Tibbi Academy, Uttar Pradesh, Lucknow, 1974).

Siddha/Tamil synonyms have been selected from the following sources:

- *Formulary of Siddha Medicine*. (Indian Medical Practitioners' Cooperative Pharmacy and Store Ltd., *IMPCOPS*, Chennai).
- *The Wealth of India* (Vol. II to XI).
- *Dictionary of Indian Medicinal Plants* (CIMAP).
- *The Ayurvedic Pharmacopoeia of India* (Vol. I to IV).
- Central Council for Research in Ayurveda and Siddha (*CCRAS*). Published literature.

The medicinal plants shortlisted by the National Academy of Ayurveda and the department of Indian Systems of Medicine (*AYUSH*) have been included in the book.

Key applications of medicinal plants are based on the following sources:

- *German Commission E* monographs.
- *ESCOP* monographs.
- *WHO* monographs.
- *Indian Herbal Pharmacopoeia*.
- *The Ayurvedic Pharmacopoeia of India* (Vol. I to IV) for traditionally recognised applications.

- *The British Herbal Pharmacopoeia*.
- *The British Herbal Compendium*.
- *Natural Medicines Comprehensive Database,* 2007.

For further study, all major findings and leads, including references to research documents and journals, can be reached through the following books (in sequence):

- *The Wealth of India* First Supplement Series (Vol. I to V).
- *The Wealth of India* original series (Vol. II to XI and revised Vol. 1 to 3).
- *Compendium of Indian Medicinal Plants* (Vol. I to V, CDRI).
- *Potter's New Cyclopaedia of Botanical Drugs and Preparations* (1998 edn).
- *Natural Medicines Comprehensive Database,* 2007.
- *PDR for Herbal Medicines*, 2004.
- *The Treatise on Indian Medicinal Plants* (Vol. I to VI).
- Additional sources, as cited at appropriate places.

Dosage of crude herbs is based on the recommendations of *The Ayurvedic Pharmacopoeia of India* (Vol. I to IV) and *Standard Nomenclature of Ayurvedic Medicinal Plants* (*CCRAS*).

Roman spellings of Ayurvedic synonyms, introduced for the first time by Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda), New Delhi-110 026, have been followed. Asiatic Society's markings are now obsolete. The text has been formatted following the style-manual of *The Wealth of India* series of *CSIR*.

Detailed references of research journals are beyond the purview of this project. The text is based on authentic treatises which are the outcome of scientific screening and critical evaluation by eminent scholars. As I have already indicated, readers, if they so desire, can always refer back to a particular research paper cited in the original source. I did not follow the trend of enumerating research papers which were not actually consulted by me. Researchers should consult the *Database on Medicinal Plants used in Ayurveda* series (*CCRAS*) and *Reviews on Indian Medicinal Plants* series (*ICMR*) for detailed bibliography.

All Indian common names have been spelled according to their actual pronunciation. The way was shown by the National Academy of Ayurveda by introducing aa in the spellings. In *The Review of Natural Products* (Facts and Comparisons) 2005 edition., Khat, Chaat, Chat, qaad, jaad and Miraa have been

included among the common names of Catha edulis, while the common name of Gymnema sylvestre is spelled as Gurmar instead of Gurmaar. Perhaps the actual pronunciation was not known to the editors. In India, O is pronounced in a specific ascent, as in Om, that is the reason uu is used instead of oo. Similarly, Sanskrit synonyms end with a, that is why aa is used for facilitating proper pronunciation. These changes have been included so that Indian names are pronounced correctly.

A few words of gratitude. Dr. V.K. Agarwal Ph. D. (Medicinal Chemistry), who was the senior editor (chemistry and pharmacology) of *The Wealth of India* series for 28 years, reviewed the entire text. He remained closely associated with all my projects and deserves much more than a few formal words of thanks. Sarita Joshi, my research associate, bore the brunt of the workload throughout the difficult phases of the project. For this she also deserves a special mention.

Finally, I would like to add that a concerted effort has been made in the book to rationalise the therapeutic coverage of Indian medicinal plants as part of my commitment to scientific herbalism.

C.P. Khare
Society for New Age Herbals
B-1/211, Janak Puri, New Delhi-110 058

A

Abelmoschus esculentus (Linn.) Moench.

Synonym ► *Hibiscus esculentus* Linn.

Family ► *Malvaceae.*

Habitat ► Native to tropical Africa; cultivated throughout India, up to 1,350 m.

English ► Gumbo, Lady Finger, Okra.

Ayurvedic ► Bhaandi, Bhindaka, Bhendaa.

Unani ► Baamiyaa.

Siddha/Tamil ► Vendai.

Folk ► Bhindi, Raamturai.

Action ► Immature pods (decoction)—emollient, demulcent and diuretic (in catarrhal affections, ardor urine, dysuria, dysentery). Seeds—antispasmodic.

Fatty fraction of the fresh watery extract of the seeds causes destruction of cancerous cell growth *in vitro*. The pods are reported to exhibit antitumour activity. An ethanolic extract of pods was effective against Gram-positive bacteria.

The ripe fruits contain quercetin, hyperin (hyperoside), hydrolysate of precipitated mucilage, proanthocyanidins, D-glucose, D-glucuronic and galacturonic acids.

Fresh flowers contain flavonol glycosides and anthocyanins.

Abies pindrow Royle.

Synonym ► *A. pindrow* Spach.
A. webbiana Lindl. var. *pindrow* Brandis.
Pinus pindrow Royle.

Family ► *Pinaceae.*

Habitat ► Kashmir, Himachal Pradesh, Tehri-Garhwal and other areas of northern India, at altitudes of 2,100–3,600 m.

English ► Pindrow-Fir, Silver-Fir, The West-Himalayan Low-Level Fir.

Ayurvedic ► Taalisha (related sp.).

Folk ► Badar, Morinda, Raisalla, Ransla.

Action ► Uses similar to those of *A. webbiana.*

Terpenoids, flavonoids, glycosides and steroids of the leaf were found to have mast cell stabilizing action in rats. Terpenoids and flavonoids offered bronchoprotection against histamine challenge in guinea pigs. The ulcer protective action of petroleum ether, benzene and chloroform fraction has been attributed to steroidal contents. Terephthalic acid demethyl ester (TADE), isolated from the leaf, exhibited protection against inflammation and bronchospasm in guinea pigs. Ethanolic extract of leaves showed significant anxiolytic effects on all the paradigms of anxiety, barbiturate hypnosis potentiation.

Pindrolactone, a lanostane-based triterpene lactone, isolated from the

A

leaves, showed mild activity against Gram-positive bacteria but exhibited potent antibacterial activity against Gram-negative bacteria *E. coli*.

Abies webbiana Lindl.

Synonym ▶ *A. spectabilis* (D. Don) Spach.
Pinus webbiana Wall.

Family ▶ *Pinaceae*.

Habitat ▶ The Himalayas from Kashmir to Assam at altitudes of 1,600–4,000 m.

English ▶ Indian Silver Fir, The West-Himalayan High-Level Fir, The East-Himalayan Fir.

Ayurvedic ▶ Taalisa, Taalisapatra, Taalisha, Patraadhya, Dhaatriparni, Dhaatripatra.

Unani ▶ Taalisapattar.

Siddha/Tamil ▶ Taalispatri.

Folk ▶ Badar, Chilrow, Morinda, Raisalla, Taalispatra. (Tallispatra, Taalispatri and Talespattre are also equated with the leaves of *Cinnamomum tamala* Nees.)

Action ▶ Expectorant, bronchial sedative, decongestant, anticatarrhal, antiseptic, carminative.

Key application ▶ Fir (*Abies alba* Miller) needle oil—in catarrhal illness of upper and lower respiratory tract (internally and externally); externally in rheumatic and neuralgic pains. Contraindicated in bronchial asthma and whooping cough. (*German Commission E.*)

A biflavonoid, abiesin, *n*-triacontanol, beta-sitosterol and betuloside are present in the leaves.

The essential oil from leaves contains alpha-pinene, *l*-limonene, delta-carene, dipentene, *l*-bornyl acetate and *l*-cardinene as major constituents.

Dosage ▶ Needles—2–6 g powder. (*API* Vol. IV.)

Abroma augusta Jacq.

Synonym ▶ *Ambroma augusta* Linn. f.

Family ▶ *Sterculiaceae*.

Habitat ▶ Throughout the hotter and moister parts of India, from Punjab and Uttar Pradesh, eastwards to Arunachal Pradesh, Assam, Meghalaya and Tripura, ascending to 1,200 m, southwards in Peninsular India.

English ▶ Perennial Indian Hemp, Devil's Cotton.

Ayurvedic ▶ Pishaacha Kaarpaasa, Pivari.

Unani ▶ Ulat-kambal.

Siddha/Tamil ▶ Sivapputtuti.

Folk ▶ Kumal, Sanukapaasi.

Action ▶ Rootbark—emmenagogue (used for dysmenorrhoea, amenorrhoea), abortifacient, galactotrophic.

The root contains abromine (betaine), friedelin, abromasterol, abromasterol A, choline, beta-sitosterol, stigmasterol and octacosanol. Leaves, reported to be useful in treating uterine

disorders, contain taraxerol, its acetate and lupeol.

Dosage ► Leaf juice—10–20 ml. Rootbark powder—3–6 g. (*CCRAS*.)

Abrus precatorius Linn.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Throughout the country, ascending to an altitude of about 1,050 m in the outer Himalayas.

English ► Indian Wild Liquorice, Jequirity, Crab's Eye, Precatory Bean.

Ayurvedic ► Gunjaa, Gunjaka, Chirihintikaa, Raktikaa, Chirmiti, Kakanti, Kabjaka, Tiktikaa, Kaakananti, Kaakchinchi. (Not to be used as a substitute for liquorice.)

Unani ► Ghunghchi, Ghamchi.

Siddha/Tamil ► Kunri.

Folk ► Chirmiti, Ratti.

Action ► Uterine stimulant, abortifacient, toxic. Seeds—teratogenic. A paste of seeds is applied on vitiligo patches.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* has indicated the use of seeds in baldness.

Seeds contain abrin, a toxalbumin, indole derivatives, anthocyanins, sterols, terpenes. Abrin causes agglutination of erythrocytes, haemolysis and enlargement of lymph glands. A nontoxic dose of abrin (1.25 mcg/kg body weight), isolated from the seeds of red var., exhibited a noticeable increase in antibody-forming cells, bone marrow cellularity and alpha-esterase-positive bone marrow cells.

Oral administration of agglutinins, isolated from the seeds, is useful in the treatment of hepatitis and AIDS.

The seed extract exhibited antischistosomal activity in male hamsters.

The methanolic extract of seeds inhibited the motility of human spermatozoa.

The roots contain precol, abrol, glycyrrhizin (1.5%) and alkaloids—abrasine and precasine. The roots also contain triterpenoids—abruslactone A, methyl abrusgenate and abrusgenic acid.

Alkaloids/bases present in the roots are also present in leaves and stems.

A. fruticulosus Wall. Ex Wight and Arn. synonym *A. pulchellus* Wall., *A. laevigatus* E. May. (Shveta Gunjaa) is also used for the same medicinal purposes as *A. precatorius*.

Dosage ► Detoxified seed—1–3 g powder. Root powder—3–6 g. (*API* Vols. I, II.)

Abutilon indicum Linn. Sweet.

Synonym ► *A. indicum* G. Don.

Family ► *Malvaceae*.

Habitat ► Throughout the hotter parts of India. Found as a weed in the sub-Himalayan tract and other hills up to 1,200 m.

English ► Country Mallow, Flowering Maples, Chinese Bell-flowers.

Ayurvedic ► Atibalaa, Kankatikaa, Rishyaproktaa.

A

Unani ► Kanghi, Musht-ul-Ghaul, Darkht-e-Shaan.

Siddha/Tamil ► Thutthi.

Folk ► Kanghi, Kakahi, Kakahiyaa.

Action ► Dried, whole plant—febrifuge, anthelmintic, demulcent, diuretic, anti-inflammatory (in urinary and uterine discharges, piles, lumbago). Juice of the plant—emollient. Seeds—demulcent (used in cough, chronic cystitis), laxative. Leaves—cooked and eaten for bleeding piles. Flowers—antibacterial, anti-inflammatory. Bark—astringent, diuretic. Root—nervine tonic, given in paralysis; also prescribed in strangury.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the root in gout, polyuria and haemorrhagic diseases.

The plant contains mucilage, tannins, asparagines, gallic acid and sesquiterpenes. Presence of alkaloids, leucoanthocyanins, flavonoids, sterols, triterpenoids, saponins and cardiac glycosides is also reported.

Asparagine is diuretic. Gallic acid is analgesic. Mucilages act by reflex, loosen cough as well as bronchial tension. Essential oil—antibacterial, antifungal.

The drug exhibits immunological activity. It augments antibody in animals. EtOH (50%) extract of *A. indicum* ssp. *guineense* Borssum, synonym *A. asiaticum* (Linn.) Sweet, exhibits anticancer activity.

Related sp. include: *Abutilon avicennae* Gaertn., synonym *A. theophrastii* Medic.; *A. fruticosum* Guill. et al.; *A. hirtum* (Lam.) Sweet, synonym *A. graveolens* Wt. and Arn.; *A. muticum* Sweet, synonym *A. glaucum* Sweet; and *A. polyandrum* Wight and Arn., synonym *A. persicum* (Burm. f.) Merrill (known as Naani-khapaat, Jhinaki-khapaat, Kanghi, Makhamali-khapaat and Khaajavani-khapaat, respectively, in folk medicine).

Dosage ► Root—3–6 g powder. (*API* Vol I.)

Acacia arabica Willd. var. indica Benth.

Synonym ► *A. nilotica* (Linn.) Delile subsp. *indica* (Benth.) Brenan.

Family ► *Mimosaceae*.

Habitat ► Throughout the drier parts of India.

English ► Babul, Black Babul, Indian Gum arabic tree.

Ayurvedic ► Babbuula, Babbuuri, Baavari, Aabhaa, Shuulikaa, Shitaka, Kinkiraata, Yugmakantaka, Sukshmapatra, Pitapushpaka.

Unani ► Aqaaqia, Babuul, Kikar, Mughilaan, Samur.

Siddha/Tamil ► Karu-velamaram, Karuvelei. Velampisin (gum).

Action ► Stembark—astringent, spasmolytic, hypoglycaemic. Gum—demulcent (soothing agent for inflammatory conditions of the respiratory, digestive and urinary tracts). Pods—used in urogenital disorders. Seeds—hypoglycaemic in normal rats; no such effect in

A

diabetic rats. Seed oil—antifungal. Flowers, pods and gum resin—used in diarrhoea and dysentery.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of stembark in acute diarrhoea and helminthiasis.

Tannin contents of the bark varies considerably (12–20%). Several polyphenolic compounds have been reported in the bark, also in the pods. The whole pod contains 12–19% tannins and 18–27% after the removal of seeds.

The seeds of *A. benthamii*, *A. nilotica* ssp. *subulata*, probably same as ssp. *indica*, are considered hypoglycaemic. Some seed components stimulate insulin secretion by beta cells.

The gum contains galactose; *l*-arabinose, *l*-rhamnose and aldobiouronic acids, also arabinobioses.

The flowers contain flavonoids—kaempferol-3-glucoside, iso-quercitrin and leucocyanidin.

Dosage ► Stembark—20–30 g for decoction. (*API* Vol. I.)

Acacia canescens Grab.

Family ► *Mimosaceae.*

Habitat ► Bihar and South India.

Ayurvedic ► Aadaari (related sp.)

Folk ► Ari, Araara.

Action ► See *A. torta.*

Acacia catechu (Linn. f.) Willd.

Family ► *Mimosaceae.*

Habitat ► Drier regions of India, particularly Punjab, Madhya Pradesh, Uttar Pradesh, Bihar, Andhra Pradesh, Orissa and Rajasthan.

English ► Cutch tree, Catechu.

Ayurvedic ► Khadira, Kadara, Somavalka, Gaayatri, Dantdhaavan, Kantaki, Raktasaara (heartwood extract).

Unani ► Khair, Kaat, Katthaa (heartwood extract).

Siddha/Tamil ► Karunkaali (bark), Kalippakku, Kadiram. Katthakkaambu, Kaasukkatti (heartwood extract).

Action ► Cutch from wood—powerful astringent (in urinary and vaginal discharge), antidiarrhoeal, haemostatic; used for treating excessive mucous discharges, haemorrhages, relaxed conditions of gums, throat and mouth, stomatitis, irritable bowel; also used as an antileprotic drug.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of dried pieces of heartwood in inflammations, skin diseases and urinary disorders, recommends its use as a blood purifier, in diseases caused by lipid disorders.

Cutch (the concentrated extract) contains tannins 2–20%, catechin 25–33%, phlobatannins including catechutannic acid 20–50%; flavonoids including quercetin, quercitrin, fisetin; gums, resins, pigments. The gum from *A. catechu* is a good substitute for Gum arabic.

A

Seed extract—hypoglycaemic to normal albino rats, but not effective in diabetic rats. The saline extract of seeds shows leuco-agglutinating activity against leukaemic cells. It agglutinates white cells from patients with different types of leukaemia. The activity is inhibited by simple sugars. Root extract shows antibacterial and fungicidal activity.

The heartwood contains a hepatoprotective principle—cyanidanol.

Astringent and antibacterial properties of catechu result from its high tannin content.

Gambrine in pale catechu shows hypotensive effects.

Fisetin in black catechu and (+)-catechin in black and pale catechu may protect against liver damage; (+)-catechin is also thought to protect against experimentally induced ulcers in animals; (+)-catechin (cianidanol) is associated with fatal anaemia. Methylcatechin, one of the major metabolites of (+)-catechin, inhibits the binding of monocytes to vascular endothelial cells; thus, the catechin found in catechu may reduce atherosclerosis. (*Natural Medicines Comprehensive Database*, 2007.)

Dosage ► Heartwood—20–30 g for decoction. (*API* Vol. I.)

Acacia chundra Willd.

Synonym ► *A. sundra* DC.

Family ► *Mimosaceae.*

Habitat ► Rajasthan, Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh on dry and rocky soils.

English ► Red Cutch.

Ayurvedic ► Khadira (related sp.).

Siddha/Tamil ► Katthakkaambu (heartwood extract).

Folk ► Laal Khair.

Action ► Uses similar to those of *A. catechu* heartwood extract.

The bark and leaves are used for ulcerated abscesses and toothache; wood for leucoderma.

EtOH (50%) extract—spermicidal and spasmolytic.

Acacia concinna (Willd.) DC.

Synonym ► *A sinuata* (Lour.) Merrill; *A. rugata* (Lamk.) Ham.

Family ► *Mimosaceae.*

Habitat ► Tropical jungles throughout India, especially in the Deccan.

Ayurvedic ► Saptalaa, Shitalaa, Saatalaa, Shrivalli, Kantvalli.

Unani ► Shikaakaai, Kharunb Nabti.

Siddha/Tamil ► Seekai, Sigakai.

Folk ► Ban-Reethaa.

Action ► Febrifuge, expectorant, emetic, spasmolytic, diuretic, antidiarrhoeal. Leaves—an infusion is given in malarial fever. Pods and seeds—decoction is used to remove dandruff (known as Shikaakaai), extensively used as a detergent. An ointment is used for skin diseases. Bark—extract is used in leprosy.

The bark yields a saponin which, on hydrolysis, yields lupeol, alpha-spinasterol and acacic acid lactone. Pods also yield saponins (20.8%). Sugars identified are glucose, arabinose and rhamnose.

The leaves contain alkaloids, nicotine and colycotomine, a triterpenoid saponin and oxalic, tartaric, citric, succinic and ascorbic acids.

The bark saponins are spermicidal, also haemolytic and spasmolytic. A decoction of pods relieves biliousness and acts as a purgative.

Acacia farnesiana (L.) Willd.

Family ► *Mimosaceae.*

Habitat ► Native to West Indies; now occurring throughout India.

English ► Cassie Flower, Cassie Absolute, Sweet Acacia.

Ayurvedic ► Arimeda, Vitkhadira.

Unani ► Vilaayati Kikar, Gandbabuul, Guyaa Babuul, Durgandh Khair.

Siddha/Tamil ► Kastuurivel, Veddayala.

Action ► Bark—astringent, demulcent, anthelmintic, antidysenteric, anti-inflammatory (used in stomatitis, ulcers, swollen gums, dental caries, bronchitis, skin diseases).

Ripe pods contain tannins and several polyphenolic compounds. Essential oil from pods—direct muscle relaxant, cardiac depressant and sedative.

Various plant parts are used in insanity, epilepsy, delirium and convulsions.

The ethanolic extract of unripe pods yields a glycosidal fraction (0.28%) which exhibits anti-inflammatory activity. It also shows significant antibacterial activity.

The plant acts as an antiseptic agent for curing sores, gums and loose teeth.

The flowers are the source of Cassie perfume.

The main constituents of the flowers are benzyl, anisic, decylic and cuminic aldehydes, as well as traces of geraniol, farnesol and linalool.

Acacia leucophloea Willd.

Synonym ► *A. alba* Willd.

Family ► *Mimosaceae.*

Habitat ► Dry regions of the country, especially in Punjab, Rajasthan and Madhya Pradesh.

English ► White Babul.

Ayurvedic ► Arimeda, Arimedaka, Arimanja, Irimeda, Vitakhadir, Godhaa-skandha, Raamaka.

Unani ► Kath Safed, Vilaayati Babuul, Guyaa Babuul.

Siddha/Tamil ► Valval, Velvayalam.

Folk ► Safed Babuul, Safed Kikar, Renvaa.

Action ► Bark—bitter, demulcent and cooling; used in biliousness and bronchitis. Seeds—haemagglutinating activity has been reported. Leaves—antisyphilitic and antibacterial. Gum—demulcent.

EtOH (50%) extract of aerial parts—hypotensive and central nervous system depressant.

A

The rootbark contains leucophleol, leucophleoxol and leucoxol.

Acacia pennata (L.) Willd.

Family ► *Mimosaceae.*

Habitat ► Throughout India; ascending to 1,700 m in the Himalayas.

Ayurvedic ► Lataakhadira, Aadaari, Ari.

Siddha/Tamil ► Indan, Indu. Iyak Koluntu (tender leaves).

Folk ► Aila.

Action ► Bark—antibilious, antiasthmatic. Leaf—stomachic, styptic (for bleeding gum), antiseptic (for scalding of urine). A decoction of young leaves is taken for body pain, headache and fever.

The bark contains tannin 9%, lupeol and alpha-spinasterol. Stem yields sitosterol.

Acacia senegal Willd.

Synonym ► *A. verek* Guillem and Perr.

Family ► *Mimosaceae.*

Habitat ► Native to Sudan. Cultivated in dry parts of western India.

English ► Gum arabic tree.

Ayurvedic ► Shveta Babbuula.

Action ► The tree yields the true Gum arabic of commerce. Mucilaginous, demulcent, emulsifying agent. Used as an ingredient in compounds for treatment of diarrhoea, catarrh. Bechic, antihaemorrhagic, anti-inflammatory. Stembark—anti-inflammatory, spasmolytic. Root—used for dysentery and urinary discharges.

The gum consists mainly of arabin. It is the salt of an organic acid, arabic acid, with metals such as calcium, magnesium and potassium.

The stembark gives octacosanol, beta-amyrin, uvaol, beta-stosterol and its glucoside and erthrodiol. An alkaloid, dimethyltryptamine has been isolated from the leaves.

Acacia suma Buch.-Ham.

Synonym ► *A. polycantha* Willd.

Family ► *Mimosaceae.*

Habitat ► West Bengal, Bihar, western peninsula.

Ayurvedic ► Shveta Khadira, Kadara, Somavalkala.

Unani ► Khor, Safed Khair.

Action ► Cutch is prepared from the heartwood. See *A. catechu*.

Acacia ferruginea DC. is also equated with Shveta Khadira.

Acacia torta (Roxb.) Craib.

Synonym ► *A. intsia* Willd.
A. caesia Wright and Arn. non-Willd.

Family ► *Mimosaceae.*

Habitat ► Throughout India in the dry and intermediate zones; ascending to an altitude of about 1,200 m in the Himalayas.

Ayurvedic ► Aadaari, Lataa Khadira (related sp., see. *A. pennata*).

Siddha/Tamil ► Kariyundu, Ingu.

Folk ► Araar, Chilar (Punjab), Aila (Maharashtra).

Action ► Flower—emmenagogue. Bark—anti-inflammatory, antiseptic (in skin diseases). Bark contains 17% tannins, triterpene alcohol, saponins of acacic acid, lupeol and a steroid, acaciol. An alkaloid, tryptamine, is present in the root and stem bark.

Various plant parts are used in cough, bronchitis, measles, tubercular fistula and in the treatment of menstrual disorders. The bark is used for washing the hair.

Acalypha ciliata Forsk.

Family ► *Euphorbiaceae.*

Habitat ► Common in plains, as a weed in gardens; also in wastelands, especially in Bangalore and Pachmarhi.

Ayurvedic ► Kuppi (smaller var.).

Folk ► Daadari (Gujarat).

Action ► See *A. indica*.

Acalypha fruticosa Forsk.

Family ► *Euphorbiaceae.*

Habitat ► Orissa, Tamil Nadu, Karnataka and Kerala.

English ► Birch-leaved Acalypha.

Siddha/Tamil ► Kuppaimeni.

Folk ► Chinnivara.

Action ► Leaves—stomachic, alterative; prescribed in digestive disorders, dyspepsia, colic, diarrhoea.

Acalypha indica Linn.

Family ► *Euphorbiaceae.*

Habitat ► Occurs throughout the plains of India, ascending the hills in Orissa up to 210 m.

English ► Indian Acalypha.

Ayurvedic ► Kuppi, Muktavarchaa, Haritamanjari

Siddha/Tamil ► Kuppaimeni.

Folk ► Khokli, Kuppi, Aamaabhaaji.

Action ► Antibacterial (leaf used in scabies). Plant—emetic, expectorant (used in bronchitis, asthma, pneumonia). Tincture of fresh plant is used in homoeopathy for incipient phthisis with bloody expectorations, emaciation and arterial haemorrhage.

The plant contains kaempferol; leaves and twigs contain acalyphamide and other amides, quinone, sterols, cyanogenic glycoside.

The herb causes intestinal irritation.

Acanthospermum hispidum DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Brazil; found as a weed throughout the greater part of India.

A

Ayurvedic ► Trikantaka. (Different from Gokshura; also equated with *Martynia diandra*, *Martineacea*, known as Kaakanaasaa.)

Action ► Used in dermatological affections.

The essential oil (yield 0.2%) showed antibacterial and antifungal activity.

Acanthus ilicifolius Linn.

Family ► *Acanthaceae*.

Habitat ► Common in tidal forests along the East and West coasts; also distributed in Meghalaya and the Andamans.

English ► Sea Holly.

Ayurvedic ► Krishna Saraiyaka. (Blue-flowered Katasaraiyaa.)

Siddha/Tamil ► Kollimulli.

Folk ► Hargozaa.

Action ► Decoction—antacid (used in dyspepsia with acid eructations), also diuretic (used in dropsy and bilious swellings). Aerial parts show effect on nictitating membrane. The root is a cordial attenuant and is used in debility associated with asthma, paralysis, leucorrhoea.

The air-dried plant contains an alkaloid, acanthicifoline, and a flavone.

Achillea millefolium Linn.

Synonym ► *A. lanulosa* Nutt.

Family ► *Compositae*; *Asteraceae*.

Habitat ► The western Himalayas from Kashmir to Kumaon.

English ► Milfoil, Yarrow, Thousand Leaf.

Unani ► Biranjaasif. *National Formulary of Unani Medicine* also equates *Leonurus cardica* Linn. (*Labiatae)* with Biranjaasif.

Folk ► Gandana, Rojmari.

Action ► Anti-inflammatory, antispasmodic (used in cold, flatulent colic, heartburn), emmenagogue, cicatrizant, antidysenteric, antihaemorrhagic, antipyretic, diaphoretic, diuretic, urinary antiseptic.

Key application ► In dyspeptic ailments, such as mild, spastic discomforts of the gastrointestinal tract. As astringent, antispasmodic, choleretic, antibacterial. (*German Commission E.*) As diaphoretic. (*The British Herbal Pharmacopoeia.*) Internally for feverish conditions, common cold and digestive complaints; topically for slow-healing wounds and skin inflammations. (*The British Herbal Compendium.*)

The plant contains flavonoids, alkaloids (achilleine), polyacetylenes, triterpenes, coumarins, tannins, salicylic acid, a volatile oil containing linalool, camphor, sabinene, chamazulene and other azulenes.

Sesquiterpene lactones are bitter and tonic. Achilleine helps arrest internal and external bleeding. Flavonoids contribute to the antispasmodic action.

The flavonoid apigenin is anti-inflammatory, antiplatelet and spasmolytic. Alkaloids and bases are anti-inflammatory. Alkaloid betoncine is

haemostatic. Salicylic acid is anti-inflammatory. Chamazulene is anti-inflammatory and antiallergenic. (*Natural Medicines Comprehensive Database,* 2007.)

An extract of the plant was found to be rich in luteolin or luteolin 7-glucoside and can be used for the treatment of hyperpigmentation of skin.

Achras zapota Linn.

Synonym ► *Manilkara zapota* (Linn.) P. van Royan
Manilkara achras (Mill.) Fosberg
Sapota achras Mill.

Family ► *Sapotaceae.*

Habitat ► Native to Central America. Cultivated chiefly in Maharashtra, Tamil Nadu and West Bengal.

English ► Sapota, Sapodilla Plum, Chicle.

Unani ► Sapotaa, Cheeku.

Siddha/Tamil ► Shimai eluppai.

Action ► Fruit—antibilious. Seed—diuretic. Fruit and bark—febrifuge.

The bark contains latex (20–25% of which consists of gutta-percha-like substance); also contains tannin (11.8%). The seeds contain quercitol.

Chewing gum consists of approximately 20% chicle, plus sugar, corn syrup and flavourings.

Achyranthes aspera Linn.

Family ► *Amaranthaceae.*

Habitat ► Throughout the tropical and subtropical regions, up to an altitude of 2,100 m, in the southern Andaman Islands.

English ► Prickly Chaff Flower.

Ayurvedic ► Apaamaarga, Chirchitaa, Shikhari, Shaikharika, Adahshalya, Mayura, Mayuraka, Kharamanjari, Kharapushpaa, Pratyakpushpaa, Aaghaat, Vashira, Kanihi.

Unani ► Chirchitaa.

Siddha/Tamil ► Naayuruvi.

Folk ► Chirchitta, Chichidaa, Latjeeraa.

Action ► Astringent, pectoral (ashes of the plant used in asthma and cough), diuretic, hepatoprotective, emmenagogue. Benzene extract of the plant exhibited abortifacient activity. The flowers, ground and mixed with sugar, are given for menorrhagia. Roots—astringent, haemostatic. Seeds—emetic; used for biliousness. Essential oil—antifungal.

Key application ► As astringent, emetic. (*Indian Herbal Pharmacopoeia.*)

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the whole plant in lipid disorders and obesity, the root for its blood-purifying property.

The plant juice and ash are used for treating bleeding piles. An alkaline powder of the plant is used in preparing Kshaarasutra of Ayurvedic medicine, which is recommended for treating fistula-in-ano.

The whole plant contains the alkaloids achyranthine and betaine. Achyranthine, a water-soluble alkaloid, is

A

reported to dilate blood vessels, lower blood pressure, decrease heart rate and increase the rate and amplitude of respiration. It also shows spasmodic effects on the rectus muscle of frog, diuretic and purgative action in albino rats.

The presence of ecdysterone and oleanolic acid is also reported in the root.

The ashes of the plant yield large quantities of potash. The seeds yield saponins and oleanolic acid and its ester.

The presence of tannins and glycosides is also reported in the plant.

Dosage ► Whole plant—20–30 g for decoction. Root—5–10 g. (*API* Vols. II, III.) Ash—500 mg to 2 g. (*CCRAS*.)

Achyranthes bidentata Blume

Family ► *Amaranthaceae.*

Habitat ► The temperate and subtropical Himalayas from Kishtwar to Sikkim at 1,200–3,200 m, Khasi hills.

Ayurvedic ► Shveta Apaamaarga. (Rakta Apaamaarga is equated with *Achyranthes rubra-fusca* Hook. f. and *A. verschaffeltii* Lam., synonym *Iresine herbstii* Hook. f.)

Siddha/Tamil ► Naayurivi.

Action ► Astringent, diuretic, spasmolytic. Plant is given in whooping cough, roots in hemicrania.

A water-soluble oligosaccharide, composed of six glucose units and three mannose units, has been isolated from the roots. It enhanced immune response and prolonged survival time of mice bearing Ehrlich carcinoma.

The roots contain free oleanolic acid (0.096%) and its saponins (1.93%). An alcoholic extract of the root showed presence of amino acids, steroids, triterpenoids, alkaloids and coumarins. The seeds afforded achyranthin.

Extract of the plant—antimicrobial.

Aconitum atrox (Bruchl) Mukherjee.

Synonym ► *Aconitum balfourii* Stapf.

Family ► *Ranunculaceae.*

Habitat ► The sub-alpine and alpine Himalayas between 3,300 and 3,900 m.

Ayurvedic ► Vatsanaabha (related sp.).

Folk ► Banwaa.

Action ► Poisonous, highly toxic.

Air-dried roots contain 1.2% total alkaloids of which pseudoaconitine is 0.4%. Pseudoaconitine is biologically 1.5 times as active as aconitine. (*A. atrox* is a poisonous species and is one of the common constituents of *Aconitum ferox* of commerce.)

Aconitum chasmanthum Stapf ex Holmes.

Family ► *Ranunculaceae.*

Habitat ► The western Himalayas from Hazara to Kashmir and

Chamba in Himachal Pradesh, between altitudes of 2,100 m and 3,600 m.

English ► Indian Napellus.

Ayurvedic ► Visha, Shringika-Visha, Vatsanaabha (related sp.).

Folk ► Mohri, Meethaa Zahar.

Action ► Sedative, antirheumatic, analgesic, antitussive, antidiarrhoeal. *Ayurvedic Formulary of India*, Part I and Part II, equated *A. chasmanthum* with Vatsanaabha. (See *A. ferox*.) It has the same uses as *A. ferox*. The alkaloid content of the root ranges from 2.98 to 3.11%; includes chasmaconitine and chasmanthinine.

Napellus, equated with *Aconitum napellus* Linn., is indigenous to Central Europe (named after the Black sea port Aconis and known as Wolfsbane, Monkshood). Aconitum of homoeopathic medicine is an alkaloid obtained from the roots and stems of *A. nepellus*. Used as an analgesic and sedative. It contains terpenoids up to 1.2%, including aconitine and aconine.

Toxic constituents of *A. napellus* are aconitine, mesaconitine, hypaconitine, 3-acetylacoitine, lappaconitine (diterpenoid-ester alkaloids), benzaconine, benzoylaconine.

Aconitine, mesaconitine and hypaconitine exert widespread effects on cardiac, neural and muscle tissue by activitating sodium channels. (*Natural Medicines Comprehensive Database,* 2007.)

Aconitine is absorbed through mucus membranes and the skin. (Francis Brinker.) It is a cardiotoxin and interacts with antiarrhythmics, antihypertensives, Digoxin/cardiac glycosides. (Sharon M. Herr.)

Dosage ► Root—10–15 mg powder. (*CCRAS*.)

Aconitum deinorrhizum Stapf.

Family ► *Ranunculaceae*.

Habitat ► Alpine regions of Chattadhar and Bhalesh ranges of Bhadarwah district in Jammu and Kashmir.

Ayurvedic ► Vatsanaabha (related sp.).

Folk ► Bashahr-Mohra, Dudhiyaa Bish, Safed Bikh.

Action ► Roots and leaves are used in rheumatism, rheumatic fever and acute headache.

The roots contain 0.9% total alkaloids, of which 0.51% is pseudoaconitine.

Aconitum falconeri Stapf.

Family ► *Ranunculaceae*.

Habitat ► The sub-alpine and alpine zones of the Garhwal Himalayas.

Ayurvedic ► Vatsanaabha (related sp.).

Folk ► Bikh, Bis, Meethaa Telia.

Action ► Sedative, carminative, anti-inflammatory (used for the treatment of nervous system, digestive system; rheumatism, fever).

A

The root alkaloids contain bishatisine, bishaconitine, falconitine and mithaconitine. Treatment with cow's milk reduces cardiotoxic effect of the root.

Aconitum ferox Wall. ex Ser.

Family ► *Ranunculaceae.*

Habitat ► The alpine Himalayas from Sikkim to Garhwal and Assam.

English ► Indian Aconite, Wolfsbane, Monkshood.

Ayurvedic ► Vatsanaabha, Visha, Amrita, Vajraanga, Sthaavaravisha, Vatsanaagaka, Shrangikavisha, Garala.

Unani ► Bish, Bishnaag.

Siddha/Tamil ► Vasanaavi, Karunaabhi.

Folk ► Bacchanaag, Bish, Mithaa Zahar, Telia Visha.

Action ► Narcotic, sedative, antileprotic, anti-inflammatory. Extremely poisonous. (Roots possess depressant activity, but after mitigation in cow's milk for 2–3 days, they exhibit stimulant activity.)

Key application ► In neuralgia. (*Aconitum napellus* L. has been listed by *German Commission E* among unapproved herbs.)

The root contains diterpenoid alkaloids, which act as a powerful poison that affects the heart and central nervous system. Aconitine has a short-lived cardiotonic action followed by cardiac depression. Topically, aconitine has analgesic, anti-inflammatory and anaesthetic activity.

Aconitum heterophyllum Wall. ex Royle.

Family ► *Ranunculaceae.*

Habitat ► Cultivated at Manali and Rahla in Himachal Pradesh. Also found in northwestern Himalayas at altitudes ranging from 2,000 to 4,000 m.

English ► Atis Root, Aconite.

Ayurvedic ► Ativishaa, Arunaa, Vishaa, Shuklakandaa, Bhanguraa, Ghunapriyaa, Ghunavallabhaa, Kaashmiraa, Shishubhaishajyaa (indicating its use in paediatrics), Vishwaa.

Unani ► Atees.

Siddha/Tamil ► Athividayam.

Folk ► Patis.

Action ► Often regarded as nonpoisosnous, antiperiodic, anti-inflammatory, astringent (used in cough, diarrhoea, dyspepsia), tonic (used after fevers), febrifuge, antispasmodic (used in irritability of stomach and abdominal pains).

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the dried, tuberous root in emesis and helminthiasis.

The roots yield 0.79% of total alkaloids, of which atisin is 0.4%. Atisine is much less toxic than aconitine and

pseudoaconitine. (The inert character of the plant is well known to the hill people, who often use it as a vegetable.) The plant possesses potent immunostimulant properties.

Dosage ► Root—0.6–2.08 g. (*API* Vol. I.)

Aconitum laciniatum (Bruhl) Stapf.

Family ► *Ranunculaceae.*

Habitat ► The sub-alpine and alpine Himalayas of Sikkim between altitudes of 3,330 m and 4,200 m.

Ayurvedic ► Vatsanaabha (related sp.).

Folk ► Kaalo Bikhmo.

Action ► Poisonous. (Found mixed with the roots of *A. ferox* and *A. spicatum* of commerce.)

Aconitum luridum Hook. f. and Thoms.

Family ► *Ranunculaceae.*

Habitat ► The Himalayas from eastern Nepal to Chumbi at altitudes of 3,600 to 4,200 m.

Ayurvedic ► Vatsanaabha (related sp.).

Action ► As potent as *Aconitum ferox.*

Aconitum palmatum D. Don.

Synonym ► *A. bisma* (Buch.-Ham.) Rapaics.

Family ► *Ranunculaceae.*

Habitat ► The alpine Himalayas of Sikkim, Nepal, the adjoining parts of southern Tibet, between altitudes of 3,000 m and 4,800 m.

Ayurvedic ► Prativishaa, Shyaamkandaa, Patis.

Folk ► Bikhamaa.

Action ► Root—antiemetic, antidiarrhoeal, antirheumatic, antiperiodic.

The root contains diterpenoid alkaloids and a nitrogenous non-alkaloid compound, benzamide. Alkaloids include vakognavine, palmatisine, vakatisine, vakatisinine and vakatidine.

The root is intensely bitter, like quinine, is used with *Piper longum* for diarrhoea and vomiting; used externally as an application for rheumatism.

Aconitum spicatum Stapf.

Family ► *Ranunculaceae.*

Habitat ► The alpine zone of the Himalayas of Sikkim and Chumbi. Principal source of Bikh or Bish of Kolkata market.

English ► Nepal Aconite.

Ayurvedic ► Vatsanaabha (related sp.).

Action ► Antipyretic, analgesic.

The roots yield 1.75% of alkaloids which contain mainly pseudoaconitine and bikhaconitine.

Aconitum violaceum Jacq. ex Stapf.

Family ► *Ranunculaceae.*

A

Habitat ► The alpine zone of the Himalayas from Gilgit to Kumaon.

Ayurvedic ► Vatsanaabha (related sp.).

Folk ► Tilia Kachnaag, Dudhia.

Action ► Nervine tonic.

Air-dried roots of the plant are reported to contain 1% indaconitine.

Acorus calamus Linn.

Family ► *Araceae.*

Habitat ► Wild and cultivated throughout India in damp marshy places from 900 to 1,800 m; common in Manipur and Naga Hills.

English ► Sweet Flag, Calamus.

Ayurvedic ► Vachaa, Ugragandhaa, Ugraa, Golomi, Shadgranthaa, Shataparvaa, Tikshnagandhaa, Kshudra-patra, Maangalyaa, Ghorbach.

Unani ► Waj-e-Turki, Waj.

Siddha/Tamil ► Vasambu.

Action ► Rhizome—nervine tonic, hypotensive, tranquilizer, sedative (with neuroleptic and antianxiety properties), analgesic, spasmolytic, anticonvulsant; used for bronchial catarrh, chronic diarrhoea and dysentery.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the dried rhizomes as a brain tonic in weak memory, psychoneurosis and epilepsy.

Four types of Calamus are used in herbal medicine: type I—*Acorus calamus* L. var. *americanus*, a diploid American var.; type II—var. *vulgaris* L. (var. *calamus*), a European triploid; type III and type IV—var. *augustatus* Bess. and var. *versus* L., subtropical tetraploids.

Beta-asarone is carcinogenic in animals. Volatile oil of types II, III and IV—major constituent is usually beta-asarone (isoasarone), up to 96%. Indian calamus oil contains asarone up to 82% and its beta-isomer. In type I, beta-asarone and other phenylpropanoids are absent. It is superior in spasmolytic activity to the other types.

Indian practitioners mostly use *A. calamus* externally. Shveta Vachaa (Haimavati, equated with *Acorus gramineus* Scoland. Ex Ait., a diploid, is used internally. Unani physicians use *Paris polyphylla* Sim. as Khuraasaani Bach.

The essential oil-free alcoholic extract of *A. calamus* possesses sedative and analgesic properties.

Alpha-asarone potentiates pentobarbital, accounts for some, but not all, neurodepressive activity. Beta-asarone is reportedly hallucinogenic. (Francis Brinker.)

The ethanolic extract of rhizomes show significant antisecretory and antiulcerogenic activity; also, protective effect against cytodestructive agents, experimentally.

Dosage ► Rhizome—60–120 mg powder. (*API* Vol. II.)

Acorus gramineus Soland. ex Ait.

Family ► *Araceae.*

Habitat ► Native to Japan, occasionally met within Sikkim at an altitude of 1,800 m, in Khasi Hills up to 1,500 m.

Ayurvedic ► Haimavati (white var. of Vachaa).

Action ► Antispasmodic (used in abdominal colic). See *A. calamus*.

Actaea spicata Linn.

Synonym ► *A. acuminata* Wall. ex Royle

Family ► *Ranunculaceae*.

Habitat ► Native to Europe; grows in temperate Himalayas from Hazara to Bhutan.

English ► Baneberry Grapewort.

Folk ► Visha-phale (Kannada).

Action ► Root—antirheumatic, anti-inflammatory, nerve sedative, emetic, purgative; used in the treatment of rheumatic fever, lumbago, scrofula, nervous disorders, chorea.

The plant is reported to contain *trans*-aconitic acid, which shows a strong cytostatic action. Its Me ether is active against Ehrlich's ascites tumours.

In folk medicine, roots are used in cases of ovarian neuralgia, uterine tenderness and sub-involution. They are adulterant of the roots of *Helleborus niger*. Berries are poisonous; used topically for skin diseases. The toxic constituent is protoanemonin (lactone). It is irritant to mucous membrane.

Actiniopteris dichotoma Kuhn.

Synonym ► *A. australis* (L. f.) Link.
A. radiata (Sw.) Link.
A. dichotoma Kuhn.

Family ► *Adiantaceae*.

Habitat ► Throughout India, especially common in Kumaon Hills and the Nilgiris, below an altitude of 1,200 m.

English ► Peacock's tail.

Ayurvedic ► Mayurshikhaa, Madhuchhadaa, Sahastrahi, Vahrishikhaa.

Action ► Styptic, antibacterial, antipyretic.

The stems and leaves contain rutin, a styptic active principle. Anthelmintic activity, attributed to the fern, was not observed in experiments on mice.

Dosage ► Root—3–5 g powder. (*CCRAS*.)

Actinodaphne hookeri Meissn.

Synonym ► *A. angustifolia* Nees.

Family ► *Lauraceae*.

Habitat ► The western Ghats, Orissa and Sikkim up to 1,500 m.

Siddha/Tamil ► Thali, Paratathali.

Folk ► Pisaa (Maharashtra).

Action ► Infusion of leaves—urinary tract disinfectant, antidiabetic, spasmolytic.

The leaves contain a very small amount of an amorphous alkaloid. They also contain beta-sitosterol, hentriacontanone, hentriacontanol and

A

quercetin-3-rhamnoside and hydrocarbons.

The bark gives an alkaloid, actinodaphnine.

Adansonia digitata Linn.

Family ► *Bombacaceae.*

Habitat ► Native to tropical Africa; common along the west coast of India.

English ► Baobab, Monkey Bread tree, African calabash.

Ayurvedic ► Sheet-phala, Ravanaamlikaa, Gorakshi, Panchparni.

Unani ► Gorakh Imli.

Siddha/Tamil ► Papparapuli.

Folk ► Gorakh Imli; Gorakh Chinchaa.

Action ► Cooling, refrigerant (allays burning sensation). Leaves—diaphoretic (used as a prophylactic against fevers). Fruit—antidysenteric, antiseptic, antihistaminic.

The fruit pulp is a source of vitamin C (175.0–445.4 mg/100 g); dried pulp contains calcium and vitamin B1. Furfural (9.6%) is obtained after distillation of the fruit. In Africa, dried leaves provide much of the dietary calcium. Aqueous extract of the bark is used for treating sickle cell anaemia.

An infusion of the leaves and flowers is given in respiratory disorders. (Powdered leaves prevented crisis in asthma induced by histamine in guinea pigs.) Dried fruit pulp also gives relief in bronchial asthma, allergic dermatitis and urticaria.

The roots contain a flavanone glycoside.

Adenanthera pavonina Linn.

Family ► *Leguminosae; Mimosaceae.*

Habitat ► The western Ghats, the Andamans and sub-Himalayan tract; also cultivated.

English ► Coral Wood, Red Wood.

Ayurvedic ► Rakta Kanchana, Rakta Kambala.

Siddha/Tamil ► Anai-gundumani.

Folk ► Ghumchi (bigger var.).

Action ► Astringent and styptic (used in diarrhoea, haemorrhage from the stomach, haematuria), anti-inflammatory (in rheumatic affections, gout). Seeds—anticephalgic; also used for the treatment of paralysis. A decoction is given in pulmonary affections.

The seed contains an anti-inflammatory active principle, O-acetylethanolamine. The leaves contain octacosanol, dulcitol, glucosides of beta-sitosterol and stigmasterol. The bark contains sitgmasterol glucoside.

Adhatoda vasica Nees.

Synonym ► *A. zeylanica* Medic. *Justicia adhatoda* Linn.

Family ► *Acanthaceae.*

Habitat ► Throughout India, up to an altitude of 1,300 m.

English ► Malabar Nut, Vasaca.

Ayurvedic ► Vaasaa, Vaasaka, Vaasikaa, Simhaasya, Simhaparni, Simhavadanaa, Vaajidanta, Vrisha, Aataruushaka.

Unani ► Arusaa.

Siddha/Tamil ► Aadaathodai.

Folk ► Vasaakaa.

Action ► Expectorant (used in bronchial, asthmatic and pulmonary affections), antispasmodic, febrifuge.

Key application ► As bronchodilatory, expectorant. (*Indian Herbal Pharmacopoeia.*) *The Ayurvedic Pharmacopoeia of India* indicates its use in dyspnoea.

The chief quinazoline alkaloid vasicine is reported in all parts of the plant, the highest being in inflorescence. It is a bitter bronchodilator, respiratory stimulant, hypotensive, cardiac depressant, uterotonic and abortifacient. An aqueous solution of vasicinone hydrochloride, when studied in mice and dogs, was found to potentiate the bronchodilatory activity of aminophylline, also that of isoprenaline. Vasicinone exhibited smooth-muscle-relaxant properties of airways.

Alkaloids present in the plant showed significant protection against allergin-induced bronchial obstruction in guinea pigs.

The leaves are found to activate the digestive enzyme trypsin.

An extract of the leaves showed significant antifungal activity against ringworm.

Adhatoda beddomei C.B. Clarke, found in Kerala, is considered to be more powerful and active than *A. vasica*. Fresh leaf juice is used in haemoptysis and menorrhagia, also as an antiasthmatic.

Jacobinia tinctoria Henl. is equated with the red-flowered var. of Vaasaa.

Dosage ► Leaf—10–20 ml juice. Dried leaves—10–20 g for deoction. Root—3–6 g powder. (*API* Vols. I, IV.)

Adiantum aethiopicum Linn.

Synonym ► *A. emarginatum* Bedd.

Family ► *Adiantaceae.*

Habitat ► North Kanara and the Nilgiri and Palni hills at higher elevations.

Ayurvedic ► Hansapadi (related sp.).

Action ► Rhizomes—decoction abortifacient. Astringent and emetic. Emollient in coughs and diseases of the chest; sudorific.

Adiantum capillus-veneris Linn.

Family ► *Adiantaceae.*

Habitat ► All along the Himalayas from Kashmir to Sikkim between altitudes of 1,800 and 2,700 m.

English ► American Maidenhair Fern, Venus Hair, Rock Fern.

Ayurvedic ► Hansaraaja, Hansapadi (related sp.).

Unani ► Parsiaavashaan.

Siddha/Tamil ► Seruppadai.

Folk ► Mubaaraka.

A

Action ► Astringent, demulcent, expectorant, antitussive, stimulant, emmenagogue. Fonds used in chronic catarrh (as an ingredient of cough and bronchial medicines); also in cold imposthumes of uterus, hard swellings and hard tumours of spleen, liver and other viscera.

The fern contains flavonoid glucosides, including rutin, isoquercetin, astragalin, kaempferol; hydroxycinnamic acid esters; terpenoids, including adiantone.

Adiantum incisum Forsk.

Synonym ► *A. caudatum* Linn.

Family ► *Adiantaceae.*

Habitat ► The plains and the lower slopes of the hills in Punjab, Rajasthan, West Bengal, Tamil Nadu and Maharashtra.

Ayurvedic ► Nilakantha-shikhaa, Mayurshikhaa, Vahrishikhaa.

Action ► Used in hemicrania, cough, fever; externally in skin diseases; used as a substitute for *A. capillus-veneris.*

The fern yields adiantone, isoadiantone, fernene, hentriacontane, hentriacontanone-16, beta-sitosterol.

Adiantum lunulatum Burm.

Synonym ► *A. philippense* Linn.

Family ► *Adiantaceae.*

Habitat ► Throughout the greater part of India, up to an altitude of 1,200 m.

English ► Walking Maidenhair Fern. Black Maidenhair (*A. venustum* G. Don is also known as Hansaraaja.)

Ayurvedic ► Hansapadi, Hansapaadi, Raktapaadi, Kitamaataa, Tripaadikaa, Hansaraaja; a substitute for Taamrachuda-paadikaa.

Siddha/Tamil ► Seruppadai.

Folk ► Raajhans, Mubaaraka.

Action ► Febrifugal, antidysenteric, soothing agent in erysipelas. The rhizome is also prescribed for strangury, atrophy, emaciation or cachexy, muscular pain; emetic in large doses.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the dried whole plant in psychosis-related fear. (It is one of the ingredients of the classical drug *Maanasamitra Vataka*, prescribed for mental disorders.)

The chemical constituents are chlorophyll-degradation products and higher carotenoids.

Dosage ► Whole plant—1-3 g (*API* Vol. III.)

Adina cordifolia Hook. f. ex Brandis

Family ► *Rubiaceae.*

Habitat ► Indigenous in deciduous forests all over India.

English ► Yellow Teak, Saffron Teak.

Ayurvedic ► Haridru, Haraduaa-kadamba, Gaur-kadamba, Girikadamba, Dhaaraakadamba, Pitadaaru, Kadambapushpa.

Siddha/Tamil ► Manjakadambu.

Folk ► Haladu, Kheta Kadam.

Action ► Antibacterial, antiseptic, antidysenteric, antibilious (used in biliary colic), febrifuge. Root—astringent.

The heartwood contains indole alkaloids; bark 7.27–9.27% tannin. The leaves contain ursolic acid and quercetin.

Aegle marmelos
(L.) Correa ex Roxb.

Family ► *Rutaceae.*

Habitat ► The plains and sub-mountain regions of India, ascending to an altitude of 1,200 m in the western Himalayas; cultivated all over India.

English ► Bael tree, Bengal Quince.

Ayurvedic ► Bilva, Shriphala, Shaandilya, Shailuusha, Shalya, Sadaaphala, Mahaakapitha (Kapitha is equated with *Feronia limonia*), Maaluura, Rudrajataa, Rudranirmaalya, Shivajataakhya.

Unani ► Bael.

Siddha/Tamil ► Vilvam, Koovilam.

Action ► Stomachic, antimicrobial (specific for diarrhoea, colitis, dysentery and enteric infections), digestive, astringent, spasmolytic, hypoglycaemic.

Key application ► As antidiarrhoeal. (*Indian Herbal Pharmacopoeia.*) Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of root in dysuria; stembark in diabetes and lipid disorders.

A number of coumarins (including xanthotoxol and alloimperatorin methyl ether), flavonoids (including rutin and marmesin), alkaloids (including alpha-fagarine), sterols and essential oils have been isolated from plant parts. Pectin is an important constituent of the fruit.

Alkaloid aegeline, present in the leaves, is efficacious in asthma. The active principle in aqueous extract of leaf shows hypoglycaemic activity similar to insulin. Leaves are also given in jaundice. Alcoholic extract of seeds shows antiallergic activity.

Marmin, a coumarin isolated from the roots, shows anti-inflammatory effects experimentally. Marmin also inhibited gastric haemorrhagic lesions in rats and exhibited antiulcer effects. Seed oil showed beneficial effects in regeneration of tumour cells.

Aurapten is found to be the most potent inhibitor of heart rate. Rootbark is used for palpitation of the heart.

Dosage ► Pulp of unripe or half ripe fruit—3 g powder. Root—6 g powder. (*API* Vols. I, III.)

Aerva javanica
(Burm. f.) Juss. ex Schult.

Synonym ► *A. persica* (Burm.f.) Merill
A. tomentosa Frosk.

Family ► *Amaranthaceae.*

Habitat ► Punjab, Central and Peninsular India.

A

English ► Javanese Wool Plant.

Siddha/Tamil ► Perumpoolai.

Folk ► Dholphuli, Khul. Paashaanabheda (southern India).

Action ► Anti-inflammatory, diuretic, anticalculus, insecticidal. Wooly seeds are used against rheumatism.

The plant extract contains ascorbic acid, kaempferol, beta-amyrin and beta-sitosterol. The leaves also contain sitosterol and its glucoside.

Aerva lanata (L.) Juss. ex Schult.

Family ► *Amaranthaceae.*

Habitat ► The warmer parts of India, ascending to 1,000 m.

Ayurvedic ► Paashaanabheda. Gorakshaganjaa, Aadaanpaaki, Shatkabhedi.

Siddha/Tamil ► Sirupeelai.

Folk ► Paashaanabheda (southern India), Gorakhagaanjaa.

Action ► Anticalculus (used in lithiasis), diuretic, demulcent, anthelmintic, antidiarrhoeal, anticholerin, bechic; leaf used in hepatitis, root in strangury. A decoction of the plant is used in catarrh of bladder. The flowers and roots are used for headache.

Key application ► As diuretic and lithontriptic. (*The British Herbal Pharmacopoeia*.)

The plant contains palmitic acid, beta-sitosterol and alpha-amyrin.

Aerva scandens Wall., synonym *A. sanguinolenta* Blume, is also known as Paashaanabheda in the south.

Species used as Paashaanabheda: *Bergenia ligulata* (north), *Aerva lanata* (south), *Coleus amboinicus* (east) and *Bryophyllum pinnatum* (west).

Dosage ► 50–100 ml decoction. (*CCRAS*.)

Aesculus hippocastanum Linn.

Family ► *Hippocastanaceae*; *Sapindaceae*.

Habitat ► Endemic to the mountains of Balkan Peninsula and western Asia. Introduced into India; occasionally grown as an ornamental tree.

English ► Horse Chestnut tree.

Unani ► Baloot. (*Quercus incana* and *Q. infectoria* have also been equated with Baloot in *National Formulary in Unani Medicine*.)

Folk ► Pu.

Action ► Anti-inflammatory, vasodilator, astringent (used for rheumatism, venous congestion, haemorrhoids), febrifuge. Leaf—used in whooping cough.

Key application ► In chronic venous insufficiency, varicosis, nocturnal systremma (cramps in the calves) and swelling of the legs. (Non-invasive treatment measures should also be followed.) (*German Commission E*, *ESCOP*, *The British Herbal Pharmacopoeia*.)

Horse Chestnut contains triterpenoid saponins (especially aescin, a complex mixture composed of acylated glycosides of protoaesigenin and barringtogenol-C, including hippocaesculin), coumarins and flavonoids. Aescin has been shown to eliminate oedema and reduce exudation. It antagonizes the effect of bradykinin, although it is not a direct bradykinin antagonist. It causes an increase in plasma levels of ACTH, corticosterone and glucose in rats. Hippocaesculin and barringtogenol-C-21-angelate show antitumour activity *in vitro*.

The hydroxycoumarin aesculin leads to increased bleeding time. (Roasting seems to destroy the toxins.) A few fruits can cause severe toxic symptoms. (Francis Brinker.) In some countries, an intravenous mixture containing aescin is used after surgery. (*Natural Medicines Comprehensive Database*, 2007.)

Aesculus indica Hook.

Family ► *Sapindaceae*; *Hippocastanaceae*.

Habitat ► The Himalayas from Kashmir to western Nepal, Kulu and Chamba in Himachal Pradesh, Tehri-Garhwal and Kumaon in Uttar Pradesh at 900–3,600 m.

English ► Indian Horse Chestnut, Himalayan Chestnut.

Folk ► Bankhor.

Action ► Antirheumatic, galactogenic, antileucorrhocic.

The leaves contain aescin, quercetin and beta-sitosterol. Stems also contain rutin, astragalin, aesculin. Seeds contain aescin, aesculuside A and B, also aliphatic esters. Seeds possess anti-inflammatory activity.

The extract of seeds is considered to be active against P-388 lymphocytic leukaemia and human epidermoid carcinoma of nasopharynx.

Aframomum melegueta (Rosc.) K. Schum.

Synonym ► *Amomum melegueta Rosc.*

Family ► *Zingiberaceae*.

Habitat ► Native to tropical Africa; cultivated in Indian gardens.

English ► Grains of Paradise, Alligator pepper, Meleguetta pepper.

Unani ► Heel Habshi.

Action ► Roots possess cardamom-like taste and are given as a decoction for constipation; also as a vermifuge for tapeworms. Juice of young leaves—styptic. The seeds contain an alkaloid, piperine; also gingerol, paradol, shogaol and zingerone.

Gingerol and shogaol suppress gastric contractions; also have sedative and analgesic actions. Pungency of the grains is due to paradol.

A decoction of the whole plant is taken internally as a febrifuge.

High oxalic acid content in the fruit may cause reduced function of the heart.

Aframomum korarima K. Schum., native to tropical Africa, known as

A

False cardamom, is also equated with Heel Habshi.

Active principle is agaric acid (agaricin), present to the extent of 14–16%.

Aganosma dichotoma (Roth) K. Schum.

Synonym ► *A. caryophyllata* G. Don

Family ► *Apocynaceae.*

Habitat ► Assam, West Bengal, Bihar, Orissa, Andhra Pradesh and Tamil Nadu; often cultivated in Indian gardens.

Ayurvedic ► Madhumaalati.

Action ► Antiseptic; anodyne (an ingredient in massage oils for paraplegia, neuralgia, sciatica); also anthelmintic and emetic.

The leaves contain quercetin, kaempferol and phenolic acids. Shoot tips and flower buds contain tannin.

Aganosma calycina A. DC. is also equated with Madhumaalati.

Agaricus albus Linn.

Family ► *Agaricaceae.*

Habitat ► Punjab, Asia Minor.

English ► Purging Agaric.

Unani ► Gharaiqoon; also equated with *Fomes officinalis* (Vill. ex Fr.) Lloyd.

Action ► Diuretic, laxative, deobstructant, expectorant; purgative and emetic in large doses; used in the treatment of night sweats in phthisis, and as a supporting drug for asthma.

Agaricus campestris Linn.

Synonym ► *Psalliota campestris* (Linn.) Fr.

Family ► *Agaricaceae.*

Habitat ► The fungi is distributed in many parts of India, particularly on the hills and plains of northern and eastern India. Grows during the rainy weather on dead organic matter, e.g. rotting leaves and manure.

English ► Field mushroom, Edible mushroom.

Ayurvedic ► Chhatraka, Bhuumichhatra.

Unani ► Kammat.

Siddha ► Venkodiveli.

Folk ► Khumbi.

Action ► A protein (2.74%) supplement and an excellent source of vitamins of B complex. Vitamins K, C and D are also present. Though all the amino acids are reported to be present, the concentration of tryptophane is particularly low.

Extracts of *A. campestris* contain tyrosinase; lowered blood pressure of hypertensive animals when administered intravenously (exhibited no effect on normal animals).

Fungal enzyme preparations have been used in digestive diseases.

Field mushroom contains amylase, maltase, glycogenase, protease, catalase, tyrosinase, phosphomonoesteras-

es, polyphosphatases, polyphenoloxidase and dehydropeptidases.

Agaricus ostreatus (Jacq.) Fries

Family ► *Agaricaceae.*

Habitat ► *Artocarpus interifolia*, indigenous to the western Ghats.

English ► Oyster Mushroom (grows on *Artocarpus integrifolia*).

Action ► Prevents excessive salivation. Also given internally in dysentery, diarrhoea, stomatitis; as a paste to gums in apthae.

Agave americana Linn.

Family ► *Agavaceae.*

Habitat ► Native to America; grown in gardens for ornamentation.

English ► Century Plant, American Aloe.

Ayurvedic ► Kaantala (related sp.).

Siddha/Tamil ► Alagai.

Folk ► Ban-Kevaraa.

Action ► Leaf juice—used for warts, cancerous ulcers and putrid tumours. Leaves are also used as a resolvant in syphilis and scrofula.

The leaves contain ten steroidal saponins (six of these are spirostanolic and four furostanolic), also hecogenin (0.20%) and piscidic acid. The seeds contain steroid sapogenins including hecogenin. The plant exhibits significant antibacterial activity.

Ageratum conyzoides Linn.

Family ► *Asteraceae, Compositae.*

Habitat ► Throughout India, up to an altitude of 1,800 m.

English ► Goat Weed, White Weed.

Ayurvedic ► Dochunty, Uchunti, Sahadevi (related sp.).

Action ► Anti-inflammatory, antibacterial, antifungal, styptic.

The leaf is reported to contain stigmasterol (59.9%) and beta-sitosterol (26.7%) as major component of sterol faction. The dried flowering plant contains the pyrrolizidine alkaloids, lycopsamine and echinatine.

An aqueous extract of leaves is reported to show haemostatic activity. The plant extract exhibited muscle relaxant activity experimentally. The ethanolic extract (95%) of roots possesses anti-inflammatory and analgesic properties.

The aqueous extract of leaves exhibits antifungal and crude plant extract antibacterial properties.

Aglaia roxburghiana Miq. Hiern

Synonym ► *A. elaegnoidea* (A. Juss.) Benth.
Milnea roxburghiana (Miq.) Wight and Arn.

Family ► *Meliaceae.*

Habitat ► Western Ghats, tropical forests in the hills of Andhra Pradesh, Karnataka, Kerala and Andaman and Nicobar islands.

Ayurvedic ► Priyangu (var.)

A

Siddha/Tamil ► Gnaazhal. (Dried flowers of *Myristica malabarica* Lam. are also used as Priyangu.)

Action ► Fruit—cooling (in febrile complaints), antipyretic, astringent, antidiarrhoeal, antidysenteric, anti-inflammatory (seeds used for painful micturition). Fruits are also used for treating obstinate skin diseases and tumours.

Bisamide alkaloids of the leaves exhibit anticancer activity (by inhibiting the growth of vinblastine-resistant KB cells).

Agrimonia eupatoria auct non L.

Synonym ► *A. pilosa* Hook.f. non Ledeb.
A. pilosa Ledeb. var. *nepalensis* (D. Don) Nakai

Family ► Rosacae.

Habitat ► The Himalayas from Kashmir to West Bengal at 900–3,000 m, and in Arunachal Pradesh, Nagaland and Meghalaya.

English ► Agrimony, Stickle Wort.

Unani ► Ghaafis.

Folk ► Belu.

Action ► Astringent, anti-inflammatory, hepatic, cholagogue, diuretic, mild haemostatic, antibacterial. Used for irritations and infections of the intestinal tract, gallbladder diseases, hyperacidity, colic, urinary disorders (bed-wetting, incontinence), sluggish liver, mucus membrane inflammations; externally for ulcerated and discharging skin, psoriasis and seborrhoic eczemas.

Key application ► In mild, non-specific, acute diarrhoea and in inflammation of oral and pharyngeal mucosa; as astringent. (*German Commission E*, *The British Herbal Pharmacopoeia*.)

The herb contains condensed tannins up to 8%, coumarins, flavonoids (glucosides of luteolin, apigenin and quercetin), polysaccharides, volatile oil. Luteolin 7-glucoside shows a cholegogic action. Aqueous extracts inhibited *Mycobacterium tuberculosis*, also strains resistant to streptomycin and *p*-aminosalicylate. Essential oil is antibacterial, active against *Bacillus subtilis*.

The ethanolic extracts of the herb are used for their antiviral properties. (*Natural Medicines Comprehensive Database,* 2007.)

Coumarins interact with anticoagulants, and drugs that increase the risk of bleeding Furanocoumarin content increase photosensitivity. (Sharon M. Herr.)

Agropyron repens Beauv.

Synonym ► *Triticum repens* L.

Family ► *Gramineae*; *Poaceae*.

Habitat ► The western Himalayas and Kashmir at altitudes between 2,700 and 3,600 m.

English ► Couch grass, dog grass, wheat grass.

Action ► Demulcent (used in cystitis, nephritis), aperient,

diuretic and urinary antiseptic, anticholesterolaemic.

Key application ► In irrigation therapy for inflammatory diseases of the urinary tract and for the prevention of kidney gravel. (*German Commission E*, *The British Herbal Pharmacopoeia*.) It is contraindicated in oedema due to cardiac or renal insufficiency.

The juice of rhizomes is used for cystitis, nephritis, scirrhous liver; decoction for tonsils and as an adjuvant for cancer; also used for gout and rheumatism, and chronic skin disorders.

The rhizome contains triticin, a carbohydrate allied to starch, a fructosan polysaccharide, inositol, mannitol; volatile oil up to about 0.05%, consisting mainly of agropyrene; vanillin glucoside; mucilage, gum, large quantities of silica; iron, minerals, vitamins, K salt. Agropyrene is reported to have broad antibiotic properties. Extracts show uric acid solvent properties. Agropyrene is antifungal.

Ailanthus excelsa Roxb.

Family ► *Simaroubaceae.*

Habitat ► Bihar, Madhya Pradesh, Gujarat, Orissa and southern India.

English ► Tree of Heaven, Maharukh.

Ayurvedic ► Aralu, Katvanga, Dirghavranta, Puutivrksha, Bhalluka. (Mahaanimba is a synonym of Melia azedarach Linn.)

Siddha ► Perru, Perumaruttu, Peruppi.

Action ► Bark—bitter, astringent, febrifuge, anthelminitic, antispasmodic, expectorant (used in asthma, bronchitis). Also used for dysentery as a substitute for Holarrhena antidysenterica.

Bark and leaves—used as tonic in debility, especially after childbirth. Leaves—used as adulterant for Adhatoda zeylanica leaves.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of stembark in high fevers and giddiness.

The bark contains several quassinoids including ailanthone derivatives. They exhibit antitumour activity against P-388 lymphocytic leukaemia and are cytotoxic against KB test system.

Dosage ► Stembark—1–3 g (API Vol. III.) Decoction—50–100 ml. (*CCRAS.*)

Ailanthus glandulosa Desf.

Synonym ► *A. altissima* (Mill.) Swingle

Family ► *Simaroubaceae.*

Habitat ► Native of China and Japan. Found in the hills of northern India up to an altitude of 2,400 m.

English ► Tree of Heaven, Ailanto.

Ayurvedic ► Aralu (related sp.).

Action ► Bark—astringent, antispasmodic, parasiticidal, narcotic, cardiac depressant (exercises powerful depressing influence on nervous system similar to that of tobacco).

A

Leaves produce dermatitis; their accumulation in well-water produces chronic gastritis.

Many quassinoids and ailanthone derivatives are vermifuge and amoebicidal. Constituents of the bark and stem, particularly ailanthone, have antimalarial activity in vitro against *Plasmodium falciparum* and in mice against *P. berghei*. (Alkaloids do not appear to have these properties.) Some quassinoids are antineoplastic, and are reported to have antileukaemic properties.

The rootbark is used in traditional Chinese medicine for dysentery and leucorrhoea. In Africa, rootbark is used in epilepsy.

Ailanthus malabarica DC.

Synonym ► *A. triphysa* (Dennst.) Alston.

Family ► *Simaroubaceae*.

Habitat ► The evergreen forests of western Ghats from Konkan southwards.

Siddha ► Perumaram.

Folk ► Guggul-dhuupa. (Maharashtra.)

Action ► Bark—febrifuge, carminative (given in typhoid, dyspepsia and constipation). Oleo resin—used for dysentery and bronchitis.

The bark and roots give a number of beta-carboline alkaloids. The resinuous exudates from trunk give several triterpenoids, including malabaricol and malabaricanediol.

Ainsliaea aptera DC.

Family ► *Compositae*; *Asteraceae*.

Habitat ► The Himalayas from Kashmir to Bhutan at altitudes of 2,400 m, extending to Khasi hills of Meghalaya.

Folk ► Karui Buuti (Garhwal).

Action ► Powdered roots—used for quick relief from acute stomach ache; diuretic.

A related sp., *A. latifolia* Sch-Bip., is used as an adulterant to *Podophyllum emodi*.

Ajuga bracteosa Wall. ex Benth.

Family ► *Labiatae Lamiaceae*.

Habitat ► The sub-Himalayan tract, plains of Punjab and the upper Gangetic plain.

Ayurvedic ► Neelkanthi.

Folk ► Ratapaati (Kumaon), Khurbanti (Punjab).

Action ► Astringent, febrifugal (given in intermittent fever), stimulant, aperient, diuretic. Used for the treatment of gout and rheumatism; also for amenorrhoea. Juice of the leaves—blood purifier. The powder is used for burns and boils. The leaves are used in fever as a substitute for cinchona.

An aqueous extract of the leaves showed diuretic activity. An alkaloidal fraction showed stimulant action on the perfused frog heart. The plant exhibited anticancer activity.

A

Alangium begoniaefolium (Roxb.) Baill.

Synonym ▶ *A. chinense* (Lour.) Harms.

Family ▶ *Alangiaceae.*

Habitat ▶ The plains and foothills, up to an altitude of 2,100 m.

Ayurvedic ▶ Ankola (related sp.).

Folk ▶ Akhani.

Action ▶ Bark and roots—sedative, anthelmintic.

A triterpenoid was responsible for the sedative effect on motor activity of rat brain.

Chloroform extract of the drug, which was devoid of anabasine, exhibited prominent sedative effect in rat. It significantly decreased concentration of norepinephrine in cortex, of dopamine and serotonin (5-HT) in brain stem, but increased concentration of 5-HT in cortex.

Alangium lamarckii Thw.

Synonym ▶ *A. salviifolium* (Linn. f.) Wang.

Family ▶ *Alangiaceae.*

Habitat ▶ The drier parts of India, in plains and foothills of southern India.

Ayurvedic ▶ Ankola, Ankota, Taamraphala, Guptasneha, Dirghakeelaka.

Siddha/Tamil ▶ Azinjil.

Action ▶ Rootbark—astringent, spasmolytic, hypotensive, also diaphoretic and antipyretic. Leaves—hypoglycaemic. Fruits—acidic, astringent, laxative and refrigerant. Used in haemorrhages, strangury and consumption. The bark is used as a substitute for *Cephaelis ipecacuanha*. It is a rich source of alkaloids structurally related to ipecac alkaloids (emetin).

The bark contains the alkaloid alangine which shows a selective action of the parasympathetic mechanism, the action being more marked on gastrointestinal tract. The root extract shows hypotensive action. Flowers contain deoxytubulosine, a potent antiplatelet aggregation component, which has a strong binding with DNA.

The plant extract possesses antineoplastic properties.

Dosage ▶ Rootbark—1–2 g powder. (*CCRAS.*)

Albizia amara (Roxb.) Boivin

Family ▶ *Mimosaceae.*

Habitat ▶ Throughout southern India in dry forests, up to 900 m, and in some parts of Madhya Pradesh.

Ayurvedic ▶ Shirish (bark—grey or greenish).

Siddha/Tamil ▶ Thuringil.

Action ▶ Leaf and flower—anti-inflammatory, used for boils and ulcers. Leaf—used for erysipelas. Seeds—astringent, antidiarrhoeal, antibacterial.

The seed extract showed DNA binding activity, which has been found to

A

be due to pithecolibine alkaloids, budmunchiamines. Budmunchiamines are antibacterial, and they inhibit platelet aggregation and human lymphocyte transformation. They also show anti-inflammatory and cytotoxic activity.

The leaves contain prodelphinidins, myricitrin, hyperin, quercitrin, *trans-p*-coumaric acid, *cis-p*-coumaric acid and *trans*-ferulic acid.

The seeds contain echinocystic acid and taxifolin-3-O-beta-D xylopyranosyl-beta-D-arbinopyranoside.

The oil from the seeds is said to cure leprosy and leucoderma.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of stembark in rhinitis, sinusitis and migraine.

Analysis of the plant revealed the presence of flavonoids, triterpenoids and triterpenoid saponins; oleanolic acid, albigenic acid, albigenin and acacic acid. The bark contains 7–11% condensed tannin; also *d*-catechin and *d*-leucocyanidin.

Aqueous extract of the bark decreased histamine-induced bronchospasm in guinea pigs.

Alcoholic extract of stembark contains cardenolide glycosides of digitoxin nature. It showed antidermatophytic activity. Anthraquinone glycosides and its aglycone exhibited antibacterial activity.

A saponin from seeds exhibited spermicidal activity in animals. EtOH (50%) extract of pods was found to be spermicidal against rat and human spermatozoa at 2% concentration.

The therapeutic properties of *Albizia julibrissin* Durazz, Pink Siris, found in the outer Himalayas from the Indus eastwards to Sikkim, are the same as those of *A. lebbeck*.

Dosage ► Stembark—3–6 g powder. 20–50 g for decoction. (*API* Vol. III.)

Albizia lebbeck (Linn.) Willd.

Family ► *Mimosaceae.*

Habitat ► All over India, from the plains up to 900 m in the Himalayas; also in the Andamans.

English ► Siris tree, East Indian walnut.

Ayurvedic ► Shirisha, Bhandi, Bhandila, Shitapushpa, Mridupushpa, Kapitana (bark—dusty black).

Unani ► Siras.

Siddha/Tamil ► Vaagei.

Action ► Antiseptic, antibacterial, antiallergic, antidermatosis, antidysenteric. Bark—used in bronchitis; bark and seeds in piles; root in hemicrania; flowers in cough, bronchitis, tropical pulmonary eosinophilia, and asthma. Pod—antiprotozoal.

Albizia procera Benth.

Family ► *Mimosaceae.*

Habitat ► All over India.

Ayurvedic ► Shveta Shirisha (bark—white or greenish-white).

Action ► Bark—a decoction is given in rheumatism and haemorrhage.

The bark contains beta-sitosterol and yields 12–17% tannins.

An oleanolic acid saponin, proceric acid saponin mixture from seeds and root saponin exhibit spermicidal activity.

Aleurities moluccana (Linn.) Willd.

Synonym ► *A. triloba* J. R. and G. Forst.

Family ► *Euphorbiaceae.*

Habitat ► Native to China; now mostly grown on the tea estates of Kangra Valley in Himachal Pradesh, and also in Assam and Bengal to provide shade for tea bushes.

English ► Candlenut tree.

Ayurvedic ► Akshota, Jangali Akharot.

Siddha/Tamil ► Naatuakrottu.

Action ► Oil from seeds—purgative; employed externally in rheumatism; ulcers; also as a hair tonic. Leaves—applied in acute rheumatism. Fruit—carminative and expectorant. Bark and flowers—used for asthma.

Aleurites fordii Hemsl., Tung Oil tree, native to China, is also equated with Jangali Akharot.

The tree was introduced on the tea estates of Assam, Bengal, Bihar, Coorg and Mysore.

Alhagi pseudalhagi (Bieb.) Desv.

Synonym ► *A. camelorum* Fisch. ex DC.
A. maurorum Medic.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► The drier parts of Rajasthan, Gujarat, Punjab and Uttar Pradesh.

English ► Camel Thorn, Persian Manna Plant.

Ayurvedic ► Yavaasaka, Yavaasa, Yaasa, Duhsparshaa, Duraalabhaa, Kunaashak. Substitute for Dhanvayaasa. Yaasa-sharkaraa (Alhagi-manna).

Unani ► Jawaansaa. Turanjabeen (Alhagi-manna).

Siddha/Tamil ► Punaikanjuri, Kanchori.

Action ► Laxative, antibilious, diuretic, diaphoretic, expectorant. Leaves—used for fever, headache, rheumatism. Flowers—blood coagulant, used for piles. Alhagi-manna—expectorant, antiemetic, laxative.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of dried whole plant in gout and haemorrhagic disorders.

The aerial parts contain flavonoids, tannins, sterols, triterpenes, saponins and anthroquinones.

The proanthocyanidins derived from the plant possess hypolipidemic and antiatherosclerotic properties. The compounds prevented an increase in rat serum cholesterol and triglycerides,

A

and they decreased the manifestation of atherosclerosis.

A polymeric proanthocyanidin, extracted from the plant, improved energy metabolism and increased the work capacity in rats.

Ethanolic extract of the aerial parts produced positive inotropic effect on rabbit heart.

Dosage ► Whole plant—20–50 g for decoction. (*API* Vol. II.) Decoction—50–100 ml. (*CCRAS*.)

Alkanna tinctoria (L.) Tausch.

Family ► *Boraginaceae*.

Habitat ► Cultivated in Central and southern Europe.

English ► Alkanet, Dyers' or Spanish Bugloss.

Unani ► Ratanjot. *National Formulary of Unani Medicine* equated Ratanjot with *Onosma echioides* Linn., found in Kashmir and Kumaon.

Siddha/Tamil ► Ratthapaalai, Surulpattai, Dineshavalli.

Action ► Astringent, antimicrobial (used for indolent ulcers, wounds, erysipelas).

The root contains up to 5% alkannins, which are lipophilic isohexenylnaphthazarin red pigments; tannins and wax. A pyrrolizidine (hepatotoxic) alkaloid has also been isolated from the herb. The alkannins have antimicrobial and wound-healing properties and are non-toxic in mice. They have been used clinically for indolent ulcers.

Allemanda cathartica Linn.

Family ► *Apocynaceae*.

Habitat ► Native to Central America and Brazil. Grown in Indian gardens.

English ► Golden Trumpet.

Folk ► Zahari Sontakkaa. (Maharashtra).

Action ► Leaves—cathartic (in moderate doses; emetic in large doses). Bark—hydragogue, in ascites.

The purgative property of the aqueous extract of leaves was confirmed pharmacologically in rats. The extract also showed antifungal activity against ringworm causing fungi. Flower extract inhibits fungal growth.

EtOH extract of roots showed invivo activity against P-388 leukaemia in mouse and in vitro against human carcinoma cells of nasopharynx (KB). The root contains antileukaemic iridoid lactone, allamandin and two other iridoids, allamandicin and allamdin.

The stems and leaves contain beta-amyrin, beta-sitosterol and ursolic acid. Petals gave flavonoids—kaempferol and quercetin.

Allium ascalonicum Linn.

Fam ► *Liliaceae*; *Alliaceae*.

Habitat ► Native to Palestine; cultivated in India.

English ► Shellot.

Ayurvedic ► Grnjana.

Unani ► Gandanaa, Ek-daanaa Lehsun, Ek-potia Lehsum. (Also equated with *Asphodelus tenuifolius* Cav.)

Action ► Anticoagulant, fibrinolytic, hypocholesterolaemic.

The aqueous extract of the bulbs contains mainly fructose (50%), besides glucose, arabinose, galactose, mannose, rhamnose, glucosamine and uronic acid. It also contains lysine, glutamic acid and aspartic acid. It shows significant activity against P-388 lymphocytic leukaemia in mice.

In experiments on rabbits, the alcoholic extracts of the bulb showed significant anticoagulant, fibrinolytic and hypocholesterolaemic properties.

Allium cepa Linn.

Family ► *Liliaceae*; *Alliaceae*.

Habitat ► Cultivated as an annual all over the country. The most important onion-growing states are Maharashtra, Tamil Nadu, Andhra Pradesh., Karnataka and Madhya Pradesh.

English ► Onion.

Ayurvedic ► Palaandu, Durgandh.

Unani ► Piyaaz.

Siddha/Tamil ► Venkaayam.

Action ► Antibiotic, antibacterial, antisclerotic, anticoagulant, anti-inflammatory, antiasthmatic, expectorant, carminative, antispasmodic, diuretic, hypotensive, antidiabetic.

Key application ► For the prevention of atherosclerosis (*German Commission E*) and age-dependent changes in the blood vessels, and loss of appetite (*WHO*).

The official onion bulb of the *Pharmacopoeia of the People's Republic of China* is a different species, *Allium macrostemon* Bge., than that of the *German Commission E* monographs, *A. cepa*. Chinese onion is used for cough, dyspnoea, angina pectoris and dysentery.

Scallions or Spring Onion of Chinese medicine are equated with *Allium fistulosum*.

Onion bulbs contain a volatile oil with sulphurous constituents, including allylpropyldisulphide; sulphur-containing compounds, including allicin, alliin; flavonoids; phenolic acids and sterols.

Hypoglycaemic activity of the onion is attributed to the allylpropyldisulphide and allicin. Diphenylamine, isolated from mature bulbs, also exhibits potent antihyperglycaemic activity.

Alliin and allicin have an inhibitory effect on platelet aggregation. Antibiotic activity is due mainly to allicin.

Regular use of onion (50 g/day) reduces insulin requirement of a diabetic patient from 40 to 20 units a day.

Thiosulphinates, isolated from onion juice, exhibited antiasthmatic activity *in vivo*.

Dosage ► Juice of bulb—10–20 ml. (*CCRAS*.)

A

Allium macleanii Baker.

Family ► *Liliaceae*, *Alliaceae*.

Habitat ► Native to Afghanistan. (A bulbous plant related to onion.)

English ► Oriental Royal Salep.

Unani ► Baadshaahi Saalab.

Action ► Anabolic and gastrointestinal tonic.

Allium porrum Linn.

Synonym ► *A. ameloprasum* Hook. f. non Linn.

Family ► *Liliaceae, Alliaceae.*

Habitat ► Native to the Mediterranean region; cultivated in India.

English ► Leek.

Folk ► Vilaayati Piyaaz. Praan (Kashmir). Seemevangayam (Tamil Nadu).

Action ► Expectorant; used as a substitute for garlic.

Leek is poor in volatile oil content in comparison with garlic, but it contains sufficient amounts of non-toxic saponins, which perhaps give it expectorant properties.

The bulbs contain several thiosulphinates, and also potentially anticarcinogenic flavonoids, quercetin and kaempferol.

Allium sativum Linn.

Family ► *Liliaceae*, *Alliaceae*.

Habitat ► Native to Central Asia. Cultivated all over India.

English ► Garlic.

Ayurvedic ► Lashuna, Rasona, Yavaneshta, Ugragandha, Mahaushadh, Arishta.

Unani ► Seer, Lahsun.

Siddha/Tamil ► Ullippoondu, Vellaippondu.

Action ► Antibiotic, bacteriostatic, fungicide, anthelmintic, antithrombic, hypotensive, hypoglycaemic, hypocholesterolaemic. Also used for upper respiratory tract infections and catarrhal conditions.

Key application ► As a supportive to dietary measures for elevated levels of lipids in blood; as a preventive measure for age-dependent vascular changes. (*German Commission E*, *ESCOP*, *WHO*, *The British Herbal Pharmacopoeia*.) Also as an antimicrobial. (*The British Herbal Pharmacopoeia*). Garlic has been shown to be effective in respiratory infections and catarrhal conditions. (*The British Herbal Compendium*.)

The Ayurvedic Pharmacopoeia of India indicates the use of the bulb as a brain tonic in epilepsy and psychic disorders.

Heavy consumption of garlic prior to surgery led to increased clotting time or reduced platelet aggregation (in human case reports). Garlic tablets at a dose of 400 mg twice daily for 12 weeks reduced platelet aggregation 59% compared with placebo in 80 patients (in human clinical study). (Francis Brinker.)

Garlic cloves are high in sulphur-containing amino acids known as alliin (no taste, no smell, no medicinal

action). With crushing or chewing alliin comes into contact with the enzyme alliinase. Alliinase, in less than 6 s, transforms alliin into allicin (strongly medicinal), which breaks down into a number of sulphur compounds including ajoene, vinyldithin and diallyl disulfide, and trisulfide. The antibiotic effect is attributed to allicin; hypoglycaemic effect to allicin and allylprophyldisulphide (also to S-allyl cysteine sulfoxide); anticarcinogenic activity to diallyl monosulfide; platelet aggregation inhibitory effect to diallyl-di- and tri-sulphides. Ajoene inactivated human gastric lipase, which is involved in digestion and absorption of dietary fats.

Diallyltetra, penta-, hexa- and heptasulphides are potential antioxidants.

Allium leptophyllum Wall. is equated with Vana Lashuna, Jangali Lahsun.

Dosage ► Bulb—3 g (*API* Vol. III.)

Allium schoenoprasum Linn.

Family ► *Liliaceae*, *Alliaceae*.

Habitat ► Native to temperate northern Europe and the U.S.; distributed in the western Himalayas from Kashmir to Kumaon at altitudes of 2,400–3,000 m.

English ► Chives.

Action ► Used in place of young onions.

An alcoholic extract of the bulbs exhibited hypotensive and cardiac depressant activity.

The aerial parts (chives) gave alliins (alkylcysteine sulfoxides), particularly methyl alliin and pentylalliin.

Allium tuberosum Rottl. ex Spreng, found in eastern India and western Himalayas, is equated with Chinese Chives. It is available in Meghalaya.

Alocasia indica (Lour.) Spach.

Synonym ► *A. macrorrhiza* (Linn.) G. Don

Family ► *Araceae*.

Habitat ► A genus of topical Asia, Malayasia and the Pacific. Found wild and cultivated all over India.

English ► Giant Taro.

Ayurvedic ► Maanaka, Maana, Maankanda, Kasaalu, Hastikarni.

Siddha/Tamil ► Merukan kizhangu.

Action ► Rootstock—mild laxative, diuretic (in anasarca); used in inflammations and diseases of abdomen and spleen. Leaf—astringent, styptic, antitumour. Root and leaf—rubefacient. Tubers—used as vegetable after eliminating oxalate content.

All parts of the plant, except tubers, contain cyanogenic principle, a mixture of triglochinin and isotriglochinin. The tubers contain sterols and high concentration of soluble oxalates (prolonged use may lead to calcium deficiency and oxaluria.) The tubers contain a trypsin/chymotrypsin inhibitor. The plant contains HCN (0.0027%). It is found to be mitogenic

A

to human peripheral blood lymphocytes.

Dosage ► Tuber—5–10 g powder. (*CCRAS*.)

Aloe barbadensis Mill.

Synonym ► *A. vera* Tourn. ex Linn.
A. indica Royle
A. littoralis Koening

Family ► *Liliaceae*; *Agavaceae*.

Habitat ► Cultivated throughout India, wild on coasts of Maharashtra, Gujarat and South India.

English ► Curacao Aloe, Barbados Aloe, Indian Aloe, Jaffarabad Aloe.

Ayurvedic ► Kanyaasaara, Eleyaka (dried juice of the leaves). Kumaari, Kumaarikaa, Kanyaa, Grihkanyaa, Ghritkumaarika (plant).

Unani ► Gheekwaar, Sibr.

Siddha/Tamil ► Sotru Kattraazhai, Kumaari. Moosaambaram (dried juice).

Folk ► Elwaa, Musabbar (dried juice of leaves).

Action ► Purgative (causes griping), emmenagogue. Gel—topically emollient, anti-inflammatory, antimicrobial (used for wound healing, sunburn).

Key application ► In occasional constipation; contraindicated in intestinal obstruction and acutely inflamed intestinal diseases, ulcerative colitis, appendicitis. (*German Commission E*, *ESCOP*, *WHO*.)

The Ayurvedic Pharmacopoeia of India recommends the use of dried juice of leaves in dysmenorrhoea and diseases of the liver.

Aloe vera improved the hypoglycaemic effect of glyburide (glibenclamide) when one tablespoonful aloe juice was given orally in the morning and at bedtime to 36 diabetic patients for 42 days. The juice (same dose) showed antihyperglycaemic activity (independently). (Francis Brinker.)

Anthraquinone glycosides, known as aloin, in small doses act as a tonic to the digestive system, and at higher doses become a strong purgative, as well as increase colonic secretions and peristaltic contractions. Resin fraction is also as important as aloin in cathartic action. In *A. barbadensis* the highest percentage of aloin is 21.8%.

Aloe produces pelvic congestion and is used for uterine disorders, generally with Fe and carminatives. The pulp is used in menstrual suppressions.

A molecule in the Aloe vera gel, acemannan, stimulates macrophages and releases immune system potentiators; enhances function of T cells and interferon production. Animal studies have shown promising results in sarcoma.

The carboxypeptidase and salicylate components of Aloe gel can inhibit bradykinin, a pain-producing agent; C-glycosyl chromone appears to reduce topical inflammation. Aloe gel also slows or inhibits the synthesis of thromboxane, which may accelerate the healing of burns. (*Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Leaf pulp juice—10–20 ml. (*CCRAS.*) Dried leaf pulp juice—125–500 mg powder. (*API* Vol. I.)

Alpinia galanga Willd.

Family ► *Zingiberaceae.*

Habitat ► The Himalayas and southern region of western Ghats.

English ► Greater Galangal.

Ayurvedic ► Kulanjana, Sthuulagranthi, Sugandhaa, Ugragandhaa, Malaya Vachaa, Mahaabhari-Vachaa. Substitute for Raasnaa (*Pluchea lanceolata*).

Unani ► Khulanjaan.

Siddha/Tamil ► Perarattai.

Action ► Rhizome—carminative (in dyspepsia), stomachic, circulatory stimulant, diaphoretic, anti-inflammatory.

Throughout southern India, the rhizome of *Alpinia galanga* is used as Raasnaa for rheumatism, intermittent fever, dyspepsia and respiratory ailments. (In the north, *Vanda tessellata* or *Pluchea lanceolata* is used as Raasnaa.)

EtOH extract of the plant shows anti-inflammatory activity. The ethanolic extract also showed significant anti-ulcer activity in rats, which has been attributed to the antisecretory and cytoprotective properties of the plant.

Major constituents of the essential oil are methyl cinnamate, cineole and *d*-pinene. In moderate doses, the oil exhibits antispasmodic action.

Unani physicians use *A. galanga* as a sex tonic. In mice, the drug caused a significant gain in the weight of sexual organs and increased sperm motility and sperm count.

Plants used as Raasnaa in Indian medicine: *Alpinia galanga* Willd. (*Zingiberaceae*) in southern India; *Pluchea lanceolata* C. B. Clarke (*Compositae*; *Asteraceae*) in Uttar Pradesh; *Vanda roxburghii* R. Br. (*Orchidaceae*) in eastern Uttar Pradesh and West Bengal; *Blepharispermum subsessile* DC. (*Compositae*; *Asteraceae*) in Madhya Pradesh; and *Dodonaea viscosa* (Linn.) Jacq. (*Sapindaceae*) in Andhra Pradesh.

Dosage ► Rhizome—1–3 g powder. Decoction—50–100 ml. (*CCRAS.*)

Alpinia malaccensis Rosc.

Family ► *Zingiberaceae.*

Habitat ► Eastern Himalayas, Assam, Khasi Hills, Meghalaya, up to 1,500 m, and western Ghats of Kerala.

Folk ► Saliyeridumpa (Tamil).

Action ► Rhizome—employed to cure sores. Fruits—emetic (used with salt).

The rhizomes yield essential oil consisting of methyl cinnamate as chief constituent.

Alpinia officinarum Hance

Family ► *Zingiberaceae.*

Habitat ► Native to China; cultivated in northern India.

English ► Lesser Galangal, Alpinia, Catarrh Root, Chinese Ginger.

A

Ayurvedic ► Kulanjan (var.).

Unani ► Khulanjaan (smaller var.).

Siddha/Tamil ► Chitrarattai.

Action ► Rhizome—a circulatory stimulant and carminative.

Key application ► As a carminative. (*The British Herbal Pharmacopoeia.*)

Aqueous and methanolic extracts of the rhizome, on oral administration, exhibited significant decrease in gastric secretion in rabbits and showed anticholinergic effect in pylorus-ligated rats.

Flavones from rhizomes are strongly antifungal against a wide variety of pathogenic fungi, responsible for major skin diseases in eastern India. Flavones were also found to be active against a number of Gram-positive and Gram-negative bacteria.

The gingerols and diaryheptanoids constituents of the rhizome are potent inhibitors of PG synthetase (prostaglandin biosynthesizing enzyme); they can also be active against 5-lipoxygenase, an enzyme involved in leukotriene biosynthesis. (*Natural Medicines Comprehensive Database,* 2007.)

Alpinia speciosa (Wendl.) K.Schum.

Synonym ► *A. Zerumbet* Burtt and R.M. Smith

Family ► *Zingiberaceae.*

Habitat ► Native to East Indies. Occurs in the eastern Himalayas from West Bengal eastwards.

English ► Light Galangal.

Siddha/Tamil ► Chitraraththai.

Action ► Rhizomes are used as a substitute for *A. galanga* and even for ginger; antiulcerative, spasmolytic.

The leaves and rhizomes yield an essential oil which contains alpha-and beta-pinene, borneol, campene and cineole as major constituents.

Alstonia scholaris R. Br.

Family ► *Apocynaceae.*

Habitat ► Throughout moist regions of India, especially in West Bengal and west-coast forests of southern India.

English ► Devil's tree, Dita Bark tree.

Ayurvedic ► Saptaparna, Saptachhada, Saptaparni, Saptaahvaa, Vishaaltvak, Shaarada, Vishamchhada.

Unani ► Chhaatim, Kaasim (Kaasim Roomi, Anjudaan Roomi is equated with *Myrrhis odorata* Scope.)

Siddha/Tamil ► Ezhilamippalai, Mukkampalai.

Folk ► Chhitavan, Sataunaa.

Action ► Bark—febrifuge, antiperiodic, spasmolytic, antidysenteric, uterine stimulant, hypotensive; used for internal fevers.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of stembark in phosphaturia and recommends it as a blood purifier.

Alstonia sp. is known as Fever Bark. *A. constricta* is native to Australia; *A. scholaris* to Australia and Southeast Asia. The bark of both the species contains indole alkaloids. *A. constricta* contains reserpine (a hyptotensive agent). *A. scholaris* contains echitamine, which has also demonstrated hypotensive effects. Though *A. scholaris* produces fall in the temperature of human patients with fever, there are conflicting reports about the activity of echitamine against *Plasmodium berghei*.

Dosage ► Stembark—20–30 g for decoction. (*API* Vol. I.)

Alstonia venenata R. Br.

Family ► *Apocynaceae.*

Habitat ► Peninsular India.

Folk ► Pazh-munipala (Tamil), Addasarpa (Kannada), Palamunpala (Malyalam).

Action ► Stembark and fruit—antiepileptic.

The plant is a rich source of indole alkaloids. Major alkaloids in the stembark are alstovenine, venenatine, 3-dehydroalstovenine, reserpine (0.003–0.3%), venoxidine and kopsinine.

Alstovenine, in lower doses, exhibits monoamine oxidase inhibitor activity; in higher doses, shows marked central stimulant effect (reversal of reserpine effects). Venenatine exhibits reserpine-like profile of activity (sedation, ptosis, reduction in motor activity).

The fruit contains vincadifformine type of alkaloids. Echitovenidine, the major alkaloid, shows monoamine oxidase-inhibitory activity both *in vitro* and *in vivo*.

Alternanthera sessilis (Linn.) R. Br. ex DC.

Synonym ► *A. triandra* Lam.
A. denticulata R. Br.
A. repens Gmel. Non-Link.

Family ► *Amaranthaceae.*

Habitat ► Throughout the hotter parts of India, especially around tanks and ponds.

Ayurvedic ► Matsyaakshi, Matsyaakshika (a multimeaning name, also indicating Braahmi, Aindri), Matsyagandhaa, Matsyaadini, Minaakshi, Bahli, Gandali, Gartkalambukaa, Vaahlikaa.

Unani ► Machhechhi.

Siddha/Tamil ► Ponnonkanni keerai.

Folk ► Gudari Saag.

Action ► Febrifuge, galactagogue, cholagogue.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of dried whole plant in diseases due to vitiated blood and obstinate skin diseases.

Young shoots contain protein 5% and iron 16.7 mg/100 g. Leaves also contain a good amount of alpha- and beta-tocopherols.

The plant gave stigmasterol, beta-sitosterol, a saturated aliphatic hydrocarbon and aliphatic ester.

Dosage ► Whole plant—2–6 g powder. (*API* Vol. II.)

A

Althaea officinalis Linn.

Family ► *Malvaceae.*

Habitat ► Native to eastern Europe; found in Kashmir and Himachal Pradesh.

English ► Marshmallow, Hollyhock.

Unani ► Khatmi, Gul-Khairu (also equated with *Althaea rosea* Linn.).

Siddha/Tamil ► Shemai-tutti.

Action ► Demulcent, emollient, antitussive (used for cough, bronchitis, gastritis, enteritis and cystitis), antilithic, diuretic.

Key application ► *(leaf and root)* In irritation of the oral and pharyngeal mucosa and associated dry cough; in mild inflammation of the gastric mucosa. (*German Commission E*, *ESCOP*.) As demulcent. (*The British Herbal Pharmacopoeia*.) In gastroenteritis, peptic and duodenal ulceration, common and ulcerative colitis. (*The British Herbal Compendium*.) Topically for varicose veins, skin ulcers, abscesses, cuts, burns.

Althaea rosea (L.) Cav., synonym *Alcea rosea* L., Hollyhock flower, is used as mucilage for prophylaxis and therapy of diseases and discomforts of the respiratory and gastrointestinal tract and for urinary complaints. (It is included among unapproved herbs by *German Commission E.*)

The root contains starch, mucilage, pectin, flavonoids, phenolic acids, sucrose, tannins and asparagines. Mucilage (18–35%) consists of a number of polysaccharides. Flavonoids include kaempferol, quercetin and diosmetin glucosides. Polyphenolic acids include syringic, caffeic, salcyclic, vanillic and *p*-coumaric acids.

The mucilages have proven biological activity including stimulation of phagocytosis *in vitro*.

The root counters excess stomach acid, peptic ulceration and gastritis.

Altingia excelsa Noronha

Family ► *Altingiaceae.*

Habitat ► Assam and Arunachal Pradesh.

English ► Storax, Oriental Sweet Gum.

Ayurvedic ► Shilaarasa, Turushka, Silhaka (substitute for *Liquidamber orientalis*, *Hamamelidaceae*).

Siddha/Tamil ► Neriyurishippal.

Action ► Resin—carminative, stomachic, antiscorbutic expectorant, antipyretic, anti-inflammatory, antistress, hepatoprotective. Externally used in scabies and leucoderma.

The ethyl acetate extract of the root of *A. excelsa* was studied for antistress effect in a variety of biological models of stress; also in stress-induced ulcers and CCl4-induced hepatotoxicity. Antistress was the most significant pharmacological property of the Storax.

Amanita muscaria Linn.

Family ► *Agaricaceae*; *Amanitaceae.*

English ► Fly Agaric (mushroom), Aga, Soma.

Ayurvedic ► Identified as Soma of Rigveda (controversial). (Sushruta described 24 varieties of Soma and 18 other drugs as its substitutes.) Intensely poisonous; used for intoxication.

The fungus has been used in Russia for preparing an intoxicating drink.

Toxic principles arecholine, muscarine and mycetoatropine (muscaridine). Muscarine stimulates postganglionic, cholinergic and neuroeffector junctions. The isoxazole constituents are psychoactive.

2–4 Fly Agaric (more than 10 g fresh) are toxic; 20 (more than 100 g fresh) are lethal. (Francis Brinker.)

A. pantherina is used in Japan for intoxication.

Aga is not a true hallucinogen. The illusions are a misinterpretation of sensory stimuli due to isoxazole, ibotenic acid, muscimol, muscazone and traces of muscarine. (*Natural Medicines Comprehensive Database,* 2007.)

Amaranthus blitum Linn. var. **oleraceus** Duthie

Family ► *Amaranthaceae.*

Habitat ► Throughout India.

English ► Trailing Amaranth, Wild Blite.

Ayurvedic ► Maarisha.

Siddha/Tamil ► Aarumathathandu, Kiraitandu.

Folk ► Marasaa.

Action ► Cooling, stomachic, emollient. Used in biliousness, haemorrhagic diathesis.

Amaranthus caudatus Linn.

Family ► *Amaranthaceae.*

Habitat ► Grown as vegetable in northern India.

English ► Love-Lies-Bleeding, Tassel Flower.

Ayurvedic ► Raam-daanaa (grain).

Siddha/Tamil ► Pungikeerai, Sirukeerai.

Folk ► Chuko.

Action ► Blood-purifier, diuretic; used in piles, strangury, dropsy and anasarca; tea has been used for relieving pulmonary conditions; also given in scrofula and applied to scrofulous sores. Antimicrobial peptides have been isolated from seeds.

In Western herbal medicine, Love-Lies-Bleeding is equated with *Amaranthus hypochondriacus*, and is used for ulcers, diarrhoea, as well as inflammation of the mouth and throat.

Preliminary evidence suggests that Amaranth seed can reduce total cholesterol and LDL, while increasing HDL, but Amaranth muffins failed to reduce cholesterol levels in hypercholesterolemic adults beyond the reduction achieved by low-fat diet. (*Natural Medicines Comprehensive Database,* 2007.)

Amaranthus spinosus Linn.

Family ► *Amaranthaceae.*

Habitat ► Cultivated fields, waste places and along roadsides.

A

English ► Spiny Amaranth, Thorny Amaranth, Spiny Pigweed.

Ayurvedic ► Tanduliya, Tandulaka, Meghnaad, Megharava, Vishaghn, Alpamaarish.

Siddha/Tamil ► Mullukkeerai.

Folk ► Katili-chaulai.

Action ► Galactogenic, laxative, emollient, spasmolytic, diuretic. Pollen extract—used for allergic asthma and allergic rhinitis. Root—used in menorrhoea.

Plant contains sterols. Leaves and stems contain alpha-spinasterol and hentriacontane. Leaves also contain amino acids with high content of lysine.

Dosage ► Whole plant—10–20 ml juice; 400–800 mg powder. (*CCRAS*.)

Amaranthus tricolor Linn.

Synonym ► *A. gangeticus* Linn.
A. melancholicus Linn.
A. polygamus Linn. Hook. f. in part.
A. tristis Linn.

Family ► *Amaranthaceae*.

Habitat ► Cultivated throughout India.

English ► Chinese Spinach, Garden Amaranth, Fountain Plant.

Ayurvedic ► Maarisha-rakta (red var.).

Siddha/Tamil ► Arai-keerai, Sirukeerai, Thandu-keerai, Mulakkerai (Tamil).

Folk ► Laal Shaak, Laal Marashaa.

Action ► Astringent (in menorrhagia, leucorrhoea, dysentery, diarrhoea, haemorrhagic colitis); also used in cough, bronchitis and consumption; externally emollient.

The plant contains amarantin, isoamarantin, betaine, amino acids, sterols.

Dosage ► Leaf, seed, root—10–20 ml juice. (*API* Vol. III.) Powder—2–4 g. (*CCRAS*.)

Amberboa divaricata Kuntze

Synonym ► *Volutarella divaricata* Benth. and Hook. F.

Family ► *Compositae*; *Asteraceae*.

Habitat ► Distributed in the Mediterranean region, extending to Central Asia and India.

Ayurvedic ► Brahmadandi (*Tricholepis glaberrima* DC. of the same family is also equated with Brahmadandi.)

Unani ► Baadaavard.

Action ► Deobstruent, aperient, febrifuge, nervine (used in debility), antiseptic (used in leucoderma).

Ammannia baccifera Linn.

Family ► *Lythraceae*.

Habitat ► Marshy areas throughout India, as a weed.

English ► Blistering Ammannia.

Ayurvedic ► Agnipatri.

Folk ► Daadmaari. (Also known as Paashaanabheda.)

Action ► Stomachic, laxative, antirheumatic, febrifuge. Leaves—used externally for ringworm, herpic eruptions and other skin diseases; rubefacient.

Leaves contain lawsone. Plant extract—antibacterial. Extracts of stem, leaf and inflorescence are more effective as compared with the seed and root extract.

Ammi majus Linn.

Family ► Umbelliferae; *Apiaceae*.

Habitat ► Cultivated in Jammu and Himachal Pradesh.

English ► Biship's Weed-Amee, Greater Ammi.

Unani ► Itarilaal, Khalah.

Action ► Source of xanthotoxin, a drug employed in the treatment of leucoderma. Dried fruit powder or extract of the plant is used topically in vitiligo.

The fruits contain ammoidin (xanthotoxin), ammidin (imperatorin) and majudin (bergapten). All the three compounds are used in leucoderma. Maximum xanthotoxin content (1%) is found in green fruits from Jammu.

The 8-MOP, methoxypsoralen constituent of the weed is one of the first agents used along with UVA radiation to treat psoriasis. (*Natural Medicines Comprehensive Database,* 2007.)

Ammi visnaga (Linn.) Lam

Synonym ► *Daucus visnaga* Linn. *Visnaga daucoides* Gaertn.

Family ► *Umbelliferae*; *Apiaceae*.

Habitat ► Cultivated as a garden ornamental; runs wild at many places in Jammu region.

English ► Khella.

Folk ► Paashaanabhedi (controversial; *Bergenia ligulata* has been equated with the classical Paashaanabheda).

Action ► Antispasmodic in renal colic, bronchial asthma, whooping cough (used by Unani physicians), vasodilator (in angina pectoris).

Key application ► *German Commission E* approved the herb on 13 March 1986, but due to information on potential risks, its status was changed to unapproved on 15 April 1994.

Khella contains khellin (1%), visnagin, khellol glycoside, flavonoids, sterols, volatile oil (0.2%). Khellin and visnagin exert a powerful antispasmodic effect on the smaller bronchial muscles, the coronary arteries and on the urinary tubules. Khellin provides relief to asthmatic patients. The drug also relieves painful spasm of stone in kidney and bladder (no more used for expelling kidney stones).

Khella does not reduce blood pressure in spite of being a vasodilator.

Khellin is toxic at 100 mg. (Francis Brinker.)

Khella is used topically for vitiligo and psoriasis. The Khellin constituent is similar to the psoralen nucle-

A

us and might be useful as a photosensitizer in patients with psoriasis. (*Natural Medicines Comprehensive Database,* 2007.)

(Several modern drugs including amiodarone, nifedipine and cromolyn have been developed from Khella.)

Amomum aromaticum Roxb.

Family ▶ *Zingiberaceae.*

Habitat ▶ North Bengal and Assam.

English ▶ Bengal Cardamom, Cardamom.

Ayurvedic ▶ Sthula-elaa (var.)

Siddha/Tamil ▶ Perelam.

Folk ▶ Morang-elaaichi.

Action ▶ Similar to that of *A. subulatum.*

The seeds yield on essential oil (1.0–1.2%) containing cineole as the principal constituent.

Chinese practitioners avoid the use of cardamom in conditions marked by symptoms of excessive heat.

Amomum subulatum Roxb.

Family ▶ *Zingiberaceae.*

Habitat ▶ Cultivated in swampy places in Bengal, Sikkim, Assam and Tamil Nadu.

English ▶ Greater or Nepal Cardamom.

Ayurvedic ▶ Sthula-elaa, Bhadraa, Bhadrailaa, Bahulaa, Prithivikaa, Triputaa, Truti.

Unani ▶ Heel Kalaan, Qaaqule Kubaar.

Siddha/Tamil ▶ Peria Elam, Kattu Elam, Beraelam.

Action ▶ Stomachic, antiemetic, antibilious, astringent, alexipharmic; used for the treatment of indigestion, biliousness, abdominal pains, vomiting, in congestion of liver. Pericarp—in headache and stomatitis.

The seeds contain a chalcone (cardamonin), a flavonoid (alpinetin), petunidin-3, 5-diglucoside and leucocyanidin glucocide; also a aurone glycoside subulin. The essential oil (2.5%) contains cineole.

Dosage ▶ Seed–1–3 g powder. (*CCRAS.*)

Amoora cucullata Roxb.

Family ▶ *Meliaceae.*

Habitat ▶ Coastal forests of West Bengal and Andaman Islands.

Folk ▶ Amur, Latmi, Natmi (Bengal).

Action ▶ Leaf—anti-inflammatory.

Amphicome emodi Lindl.

Family ▶ *Bignoniaceae.*

Habitat ▶ Temperate Himalaya from Kashmir to Kumaon at 600–2700 m.

Folk ▶ Kaur (Kashmir).

Action ▶ Plant—febrifuge; used as a substitute for *Swertia chirayita.*

An iridoid glycoside named amphicoside is reported from the plant.

Amorphophallus campanulatus (Roxb.) Blume ex Decne.

Family ► *Araceae.*

Habitat ► Native to tropical Asia; cultivated throughout India.

English ► Elephant-foot Yam.

Ayurvedic ► Suurana, Kanduula, Arshoghna, Kand-ayak, Kandala.

Unani ► Zamin-qand, Zamikand.

Siddha/Tamil ► Chenaikkizhangu. Kaathukarunai (wild var.)

Action ► Corm is prescribed in bronchitis, asthma, abdominal pain, emesis, dysentery, enlargement of spleen, piles, elephantiasis, diseases due to vitiated blood, rheumatic swellings.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of corm in prostatic hyperplasia.

(The corm is irritant due to the presence of calcium oxalate. It can be consumed after it is washed well and boiled in tamarind water or butter milk.)

The corm contains an active diastatic enzyme amylase, betulinic acid, tricontane, lupeol, stigmasterol, beta-sitosterol and its palmitate and glucose, galactose, rhamnose and xylose.

Intake of 3.6-7.2 g of konjac (*Amorphophallus konjac* tuber) mannan for 90 days reduced the dose of insulin or hypoglycaemic drugs (in human clinical study). (Francis Brinker.)

Amorphophallus sylvatius Kunth. is equated with the wild var. of Suurana, used especially in the treatment of piles.

Dosage ► Dried corm—2–10 g powder. (*API* Vol. III.) 3–5 g powder. (*CCRAS.*)

Amygdalus communis Linn.

Synonym ► *Prunus amygdalus* Baill.
A. communis var. *dulcis* (sweet almond).
A. communis var. *amara* (bitter almond).

Family ► *Rosaceae.*

Habitat ► Native to Asia Minor and Persia; cultivated in India in cooler parts of Punjab and Kashmir.

English ► Almond

Ayurvedic ► Vaataama, Vaataada.

Unani ► Badaam, Loz.

Siddha/Tamil ► Vaadumai.

Action ► Sweet almonds—nutrient, nervine tonic, demulcent. Oil—externally for skin. Bitter almonds—not used medicinally.

Almond flour and almond butter are free from starch and used in foods for diabetics and for patients with peptic ulcers. Chief protein in kernels is globulin.

Amygdalus persica Linn.

Synonym ► *Prunus persica* Batsch.

Family ► *Rosaceae.*

A

Habitat ► Native to China; cultivated in Himalayan regions; grows in tropical and semi-tropical regions and temperate climates.

English ► Peach tree.

Ayurvedic ► Aaruka.

Unani ► Aaaduu, Khokh.

Action ► Leaves and bark—expectorant (used in cough, whooping cough, and chronic bronchitis), sedative, stomachic, demulcent, antiscorbutic, diuretic. Fresh leaves—anthelmintic. Powder of leaves—styptic (externally). Fruit—stomachic, antiscorbutic.

Anacardium occidentale Linn.

Family ► *Anacardiaceae.*

Habitat ► Native to tropical America, from Mexico to Peru and Brazil. Cultivated largely in Malabar, Kerala, Karnataka, Tamil Nadu and Andhra Pradesh, and to some extent in Maharashtra, Goa, Orissa and West Bengal.

English ► Cashew Nut.

Unani ► Kaaju.

Siddha/Tamil ► Mindiri.

Action ► Leaves and bark—fungicidal, vermicidal, protozoicidal, antimicrobial (used for toothache, sore gums). Karnel—eaten for its high protein content. Cashew apple—antiscorbutic. Resinous juice contained in the seeds—used in cases of mental derangement, memory disturbances, palpitation of heart, rheumatic pericarditis, sexual debility.

The nut contains 45% fat and 20% protein. Leaves contain flavonoids, mainly glycosides of quercetin and kaempferol, and hydroxybenzoic acid. The bark contains a balsam-containing anacardic acid, anacardol, cardol and ginkgol. The caustic liquid in the shell contains about 39% anacardic acid, a mixture of alkyl salicylic acid derivatives. The leaves are febrifuge. Anacardic acid is bactericidal, fungicidal, vermicidal and protozoicidal. The leaves and bark exhibited hypotensive activity in rats.

The phenolics of the cashew-nut shell oil have inhibited the enzymic activity of alpha-glucosidase, invertase and aldose reductase (anacardic acids being the most potent). Cardols have also shown antifilarial activity in vitro. Anacardic acids, cardols and methyl cardols have been found to exhibit moderate cytotoxic activity.

Anacyclus pyrethrum DC.

Synonym ► *A. officinarum* Hayne

Family ► *Compositae*; *Asteraceae*.

Habitat ► Native to the Mediterranean region; cultivated in Algeria.

English ► Spanish, Pellitory, Pyrethrum Root.

Ayurvedic ► Aakaarakarabha, Aakallaka, Aakulakrit, Agragraahi.

Unani ► Aaqarqarhaa.

Siddha/Tamil ► Akkiraakaaram.

Action ► Stimulant, cordial, rubefacient. A gargle of infusion is prescribed for relaxed vulva. Root—used for toothache, rheumatic and neuralgic affections and rhinitis. Roots, along with the root of *Withania somnifera* and *Vitis vinifera*, are used in epilepsy.

Along with other therapeutic applications, *Ayurvedic Pharmacopoeia of India* indicates the use of the root in sciatica, paralysis, hemiplegia and amenorrhoea.

The root contains anacycline, isobutylamide, inulin and a trace of essential oil.

The local anaesthetic activity of the alcoholic (2%) extract of the root was found to be comparable to that of xylocaine hydrochloride (2%) in dental patients.

Use of the drug in patients with insulin-dependent diabetes mellitus reduces the dose of insulin. It decreased the plasma glucose and serum cholesterol levels after oral administration for 3–6 weeks. (The plant is mixed with *Helleborus nigar* in a ratio of 1:3.) The plant extract inhibited tobacco-induced mutagenesis by 47.5% at a concentration of 1 mg/plate.

Dosage ► Root—500 mg to 1 g powder. (*CCRAS.*)

Anagallis arvensis Linn.

Family ► *Primulaceae.*

Habitat ► Northwestern Himalayas from Kashmir eastwards to Nepal, hills of West Bengal; Central and southern India.

English ► Bird's Eye, Bird's Tongue, Blue Pimpernel, Scarlet Pimpernel.

Unani ► Anaaghaalis.

Folk ► Jonkmaari (Maharashtra), Dhabbar (Punjab), Jighanaa, Jenghani.

Action ► Plant—anti-inflammatory, astringent, deobstructant, antifungal, nematocidal; toxic to leeches.

The plant yields anagalligenone B. The presence of quaternary alkaloids, gluco-fructoside and tannin have been reported. The root yields glycosidic saponins, including cyclamin. An acetyl saponin, isolated from the plant, was found to possess marked taenicidal activity but had no effect on roundworms.

A methanolic extract of the aerial parts showed activity against herpes simplex I, adenovirus type II and polio type II. Triterepene saponins have oestrogenic activity.

Anamirta cocculus (Linn.) Wight and Arn.

Synonym ► *A. paniculata* Colebr.

Family ► *Menispermaceae.*

Habitat ► The Khasi Hills, Orissa and peninsular India.

English ► Fish Berry, Levant Berry, Poison Berry, Crow Killer.

Ayurvedic ► Kaakaadani, Kaakamaari.

Siddha/Tamil ► Kaakkaikkollividai.

Action ► Insecticide, antifungal; highly valued in skin diseases; used

A

externally to kill lice and other parasites.

The leaves and fruit contain picrotoxin (up to 5%) and alkaloids. Picrotoxin (sesquiterpene glycoside) is a powerful poison and nerve stimulant. It is rarely taken internally. Cocculus (a tincture prepared from the powdered seeds of *Cocculus indicus*) is used internally as a homoeopathic medicine for convulsions, neurological disorders and psychosis-related fear.

Picrotoxin at 20 mg is toxic, and two to three berries are lethal. (Francis Brinker.)

Ananas comosus (Linn.) Merrill

Family ► *Bromeliaceae.*

Habitat ► Native to South America; cultivated mostly in Tamil Nadu, coastal Andhra Pradesh, Assam, Kerala, Karnataka, West Bengal, Tripura and Orissa.

English ► Pineapple.

Ayurvedic ► Anaanaasa, Bahunetra.

Unani ► Anannaas.

Siddha/Tamil ► Annanshippazham, Annasi.

Action ► Anti-inflammatory (fresh juice used as a gargle for sore throat). A proteolytic enzyme, bromelain, is derived from the stem—anti-inflammatory, smooth muscle relaxant, digester, inhibitor of blood platelet aggregation. (It is used for cellulitis, post-operative oedema, sinusitis and for promoting digestion of proteins.)

Key application ► Bromelain, the proteolytic enzyme, is used in acute postoperative and post-traumatic conditions of swellings, especially of the nasal and paranasal sinuses. (*German Commission E.*) In Europe, a patented tape that contains bromelain is used for debriding escharotic skin. (Internally, bromelain's bioavailability has been questioned.)

Anaphalis neelgerriana DC.

Family ► *Compositae*; *Asteraceae.*

Habitat ► The Nilgiri Hills at 2,100–2,500 m.

Ayurvedic ► Raktaskandana.

Folk ► Kaatplaaster (Nilgiri hills).

Action ► Antiseptic. Fresh leaves are bruised and applied to wounds and cuts as plaster.

An acyl flavonoid glycoside, anaphaloside, along with isoquercitrin and astragalin, has been isolated from the flowers of a related sp. *Anaphalis contorta*, used as an antibacterial and styptic.

Anastatica hierochuntica Linn.

Family ► *Cruciferae.*

Habitat ► Arabia, Palestine, Syria.

English ► Jericho Rose.

Unani ► Kafemariyam, Kafe-aaishaa.

Folk ► Garbha-phool.

Action ► Used in difficult labour.

Anchusa italica Retz.

Synonym ► *A. azurea* Mill.

Family ► *Boraginaceae*.

Habitat ► Indian gardens, and hills.

English ► Cow's Tongue Plant.

Ayurvedic ► Gojihvikaa (considered as a vegetable, equated with *Launaea asplenifolia* Hook. f., *Compositae*, *Asteraceae*.) Unani Gaozabaan is a different drug.

Unani ► Gaozabaan. (Now equated with species of *Boraginaceae*, particularly *Borago officinalis* Linn. Imported Unani drug Gaozabaan consists of the leaves and nutlets of *Anchusa strigosa* Labill and *Echium amoenum* Fisch. and Mey.)

Action ► Stimulant, tonic, demulcent; used in bilious complaints, fever, cough, asthma; as diuretic in bladder and kidney stones. Oil—a rich source of vitamin E (0.72%), more than that of wheat-germ oil (0.18%). The nutlets show positive tests for alkaloids and tannins. The flowers yield anthocyanins and the leafy stems yield bornesitol.

Andrographis echioides Nees

Family ► *Acanthaceae*.

Habitat ► Warmer parts of India.

Folk ► Ranchimani (Maharashtra).

Action ► Febrifuge, diuretic.

The plant contains a flavone, echiodinin, and its glucoside, echioidin. EtOH (50%) extract of the plant exhibited diuretic activity in animal studies.

Andrographis panicultata Wall. ex Nees

Family ► *Acanthaceae*.

Habitat ► Throughout India, from Himachal Pradesh to Assam and Mizoram, and all over southern India.

English ► Creat.

Ayurvedic ► Kaalmegha, Bhuunimba, Bhuuminimbaka, Vishwambharaa, Yavtikta, Kalpanaatha, Kiraata-tikta (var.).

Unani ► Kiryaat.

Siddha/Tamil ► Nilavembu.

Action ► Hepatoprotective, cholinergic, antispasmodic, stomachic, anthelmintic, alterative, blood purifier, febrifuge. It acts well on the liver, promoting secretion of bile. Used in jaundice and torpid liver, flatulence and diarrhoea of children, colic, strangulation of intestines and splenomegaly; also for cold and upper respiratory tract infections.

Key application ► As bitter tonic, febrifuge and hepatoprotective. (*Indian Herbal Pharmacopoeia*.)

Kaalmegha, officinal in IP, consists of dried leaves and tender shoots, which yield not less than 1% andrographolide on dry-weight basis.

Several active constituents have been identified from the leaf and rhizome, including andrographolide, deoxyandrographolide and other diterpenes.

Andrographolide exhibited strong choleretic action when administered *i.p.* to rats. It induces increase in bile

flow together with change in physical properties of bile secretion. It was found to be more potent than silymarin.

Andrographolide was found to be almost devoid of antihepatitis-B virus surface antigen-like activity (when compared with picroliv.)

The leaf and stem extracts of Kaalmegha/andrographolide given *s.c.* or orally did not change blood sugar level of normal or diabetic rats.

Alcoholic extract of the plant exhibited antidiarrhoeal activity against *E. coli* enterotoxins in animal models.

Clinical evidence of effectiveness of andrographis in humans is limited to the common cold. Preliminary evidence suggests that it might increase antibody activity and phagocytosis by macrophages, and might have mast cell-stabilizing and antiallergy activity. (*Natural Medicines Comprehensive Database,* 2007.)

The herb is contraindicated in bleeding disorders, hypotension, as well as male and female sterility (exhibited infertility in laboratory animals).

Dosage ► Whole plant—5–10 ml juice; 50–100 ml decoction; 1–3 g powder. (*CCRAS.*)

Andropogon muricatus Retz.

Synonym ► *Vetiveria zizanioides* (Linn.) Nash.

Family ► *Poaceae.*

Habitat ► All over India.

English ► Vetiver, Cuscus.

Ayurvedic ► Ushira.

Unani ► Khas.

Siddha ► Vettiveru.

Action ► Roots—refrigerant, febrifuge, diaphoretic, stimulant, stomachic and emmenagogue; used in strangury, colic, flatulence, obstinate vomiting; paste used as a cooling application in fevers.

Major constituents of the essential oil are vetiselinenol and khusimol. Several sesquiterpenoids, including vetidiol, are also present. The two types of oils, laevorotatory and dextrorotatory, from northern India and southern India, respectively, are biochemically different.

Andropogon sp.: see Cymbopogon sp.

Anemone obtusiloba D. Don

Synonym ► *A. pulsatilla* Linn.

Family ► *Ranunculaceae.*

Habitat ► Native to Europe; thrives in dry grassland in central and northern parts of the continent.

English ► Wind-Flower, Wood Anemone, Pasque Flower, Pulsatilla.

Unani ► Gul-laalaa, Shaqaaq-un-Nomaan.

Action ► Nervine and sedative (used for anxiety neurosis, nervous exhaustion, tension, headache, migraine, insomnia), antispasmodic (in catarrh); used for amenorrhoea, inflammation of ovaries, painful menstruation and genito-urinary infections. The rootstock is given with milk for concussions. The

seeds cause vomiting and purging. The seed oil is used in rheumatism.

Pulsatilla contains ranunculin, which hydrolyzes to a toxic, unstable compound protoanemonin, which readily dimerizes to non-toxic anemonin.

Anemonin and protoanemonin exhibit sedative and antipyretic activity. Protoanemonin is also antimicrobial. (Topically, Pulsatilla is used for infectious diseases of the skin.)

Anethum sowa Roxb. ex Flem.

Synonym ► *A. graveolens* Linn. var. *sowa* Roxb.
A. graveolens DC.
Peucedanum sowa Roxb.
Peucedanum graveolens Benth.

Family ► *Umbelliferae*; *Apiaceae*.

Habitat ► Cultivated all over India.

English ► Indian Dill, Sowa.

Ayurvedic ► Shataahvaa. Shatapushpaa (also accepted as *Foeniculum vulgare* Mill., equated with Mishreya, Mishi, Madhurikaa).

Unani ► Shibt, Soyaa.

Siddha/Tamil ► Sadakuppai.

Action ► Carminative, stomachic, antispasmodic.

Key application ► In dyspepsia. (*German Commission E.*)

The fresh and dried leaf is used for prevention and treatment of diseases and disorders of the gastrointestinal tract, kidney and urinary tract, for spasms and sleep disorders. (Included among unapproved herbs by *German Commission E.*)

An aqueous dill extract, administered intravenously, lowers blood pressure, dilates blood vessels, stimulates respiration and slows heart rate in animals. (*Natural Medicines Comprehensive Database,* 2007.)

Dill seeds contain up to 5% volatile oil (about half of which is carvone), flavonoids, coumarins, xanthones and triterpenes. The yield of the oil from Indian A. sowa varies from 1.3 to 3.5%. Carvone is the major constituent (19.5–69.7%). The oil from seeds is used for flatulence in children and enters into the preparations of gripe water. The oil is also antimicrobial and antifungal.

Dill apiol is considered undesirable and toxic. Vizag fruit var. from Andhra Pradesh is dill-apiol-free and with 54–56%, carvone content having same flavonoid pattern as A. sowa.

Dosage ► Dried fruit—3–6 g powder. (*API* Vol. III.) Fruit, leaf—1–3 g powder. (*CCRAS.*)

Angelica archangelica Linn. var. **himalaica** (C. B. Clarke) Krishna and Badhwar

Family ► *Umbelliferae*; *Apiaceae*.

Habitat ► Native to Syria; now grown in Kashmir at 1,000–3,900 m.

Ayurvedic ► Chandaa, Chandaamshuka, Kathachoraa.

Action ► Expectorant, carminative, digestant, cholagogue, antispasmodic, diaphoretic, diuretic, anti-inflammatory, smooth muscle relaxant, antifungal, antibacterial.

A

Key application ► In flatulence and peptic discomforts. The root is a component in numerous gastrointestinal, cholagogue and biliary remedies in Germany. (Angelica root is an approved herb, whereas the seed and above-ground parts have been included among unapproved herbs by *German Commission E.*)

Chinese angelica root, Dong Quai, is equated with Angelica sinensis. It is prescribed internally for menstrual irregularity, lack of menstruation and painful menstruation.

The roots from Kashmir yield furocoumarins, phenol compounds and flavonoids.

Xanthotoxol exhibited antihistamintic and antinicotinic activities on guinea-pig ileum. The dry extract has been shown to have anti-inflammatory activity.

The root is reported to inhibit bacterial and fungal growth.

Furocoumarins, especially psoralen and 8-methoxypsoralen, are used in the photochemotherapy of psoriasis and vitiligo. The biological activity is due to covalent linkage formed with DNA by irradiation with long-wavelength UV light.

Most of the coumarins have shown significant calcium antagonistic activity in vitro.

Angelicin, a resin, is stimulating to the lungs and skin. contraindicated in bleeding disorders, peptic ulcers and pregnancy. (Sharon M. Herr.)

Dosage ► Root—1–3 g powder. (*CCRAS.*)

Angelica glauca Edgew.

Family ► *Umbelliferae*; *Apiaceae*.

Habitat ► Kashmir and Chamba in Himachal Pradesh, between 1,800–3,700 m.

English ► Angelica.

Ayurvedic ► Choraka, Chorakaa, Kopanaa, Chorakaakhya, Nishaachara, Dhanhar, Taskara, Kshemaka.

Action ► Root—cordial and stimulant, carminative (used in constipation), expectorant, diaphoretic.

The root contains furocoumarins, also dimeric, lingusticum lactone.

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Anisochilus carnosus Wall.

Family ► *Labiatae*; *Lamiaceae*.

Habitat ► The western Himalayas, Central and southern India.

Folk ► Karpuravalli (southern region).

Action ► Stimulant, expectorant and diaphoretic. Juice of fresh leaves is used in urticaria and other allergic conditions; a domestic remedy for coughs and cold. Alcoholic extract of the whole plant—antibacterial. Essential oil—antitubercular.

The oil exhibits antihistaminic property in vitro on smooth muscles of the uterus and the intestines. It also possesses muscle-relaxant action; bactericidal and fungicidal properties. The

leaves contain glucosides of luteolin and apigenin.

Anisomeles malabarica (Linn.) R. Br. ex Sims

Family ► *Labiatae; Lamiaceae.*

Habitat ► The western Ghats from Maharashtra to Karnataka; Andhra Pradesh, Kerala and Tamil Nadu.

English ► Malabar Catmint.

Ayurvedic ► Sprikkaa.

Siddha/Tamil ► Irattaipeyameratti.

Action ► Antispasmodic (used in dyspepsia, colic), antipyretic, diaphoretic, antiperiodic, emmenagogue, antirheumatic. The oil is used externally as an embrocation in rheumatic arthritis.

The plant contains beta-sitosterol, letulinic acid, ovatodiolide and anisomelic acid. The essential oil from tops and flowers yield a terpene hydrocarbon, citral and geranic acid.

Annona reticulata Linn.

Family ► *Annonaceae.*

Habitat ► Native to the West Indies. Cultivated in Bengal, Assam, Khasi Hills and southern India.

English ► Bullock's Heart, Common Custard Apple.

Ayurvedic ► Raamphala.

Siddha/Tamil ► Aninuna.

Folk ► Luvuni.

Action ► Leaves—insecticide, anthelmintic, styptic, externally used as suppurant. Unripe and dried fruit—antidysenteric. Bark—powerful astringent, used as antidysenteric and vermifuge.

Rootbark, leaves and stems gave isoquinoline alkaloids. Two acetogenins, annoreticuin and isoannoreticuin, isolated from the leaves, were found to be selectively cytotoxic to certain human tumours.

The leaves and stems also gave alkaloids—dopamine, salsolinol and coclaurine.

Annona reticulata, *Annona muricata*, *Annona squamosa* and *Annona cherimola* are known as Raamphala, Lakshman-phala, Sitaa-phala and Hanumaan-phala, respectively.

Annona squamosa Linn.

Family ► *Annonaceae.*

Habitat ► A native to South America and the West Indies; now cultivated throughout India.

English ► Custard Apple, Sugar Apple, Sweet-sop.

Ayurvedic ► Gandagaatra, Sitaa phala (also equated with Curcurbita maxima).

Unani ► Sharifaa.

Siddha/Tamil ► Sitaaphalam, Atta.

Action ► Leaves—insecticide (seed powder, mixed with leaf juice is used for removing lice from scalp). Seeds—abortifacient. Root—purgative, used in blood dysentery.

A

Fruit—invigorating, sedative to heart, antibilious, antiemetic, expectorant. Dried, powdered unripe fruits—used for treating ulcers. Ripe fruit made into paste with betel leaves is applied to tumour to hasten suppuration. Leaves, bark, unripe fruit—strongly astringent; used for diarrhoea and dysentery.

A fraction of total alkaloid from roots exhibits antihypertensive, antispasmodic, antihistaminic and bronchodilatory properties. Leaves contain a cardiotonic alkaloid, quinoline. Squamone and bullatacinone were selectively cytotoxic to human breast carcinoma.

In Cuban medicine, leaves are taken to reduce uric acid levels.

Anogeissus latifolia Wall. ex Bedd.

Family ► *Combretaceae.*

Habitat ► Central and southern India.

English ► Axle-wood, Button tree, Ghatti tree.

Ayurvedic ► Dhava, Dhurandhara, Shakataahya. Indravrksha (*A. acuminata* Wall. ex Bedd. is a related sp. of Dhava).

Unani ► Dhaawaa.

Siddha/Tamil ► Vellaynaga.

Folk ► Ghatti (Gum).

Action ► Astringent, cooling, used in diarrhoea, dysentery, ulcers, piles, urinary disorders and dysuria. Gum—used as a tonic after delivery.

The leaves, bark and heartwood yield quinic and shikmik acids; leaves contain gallotannin (90–95% of the tannins). The young leaves and shoots contain 50% tannins (dry basis). The bark contains 12–18% tannins. Heartwood contains gallic acid, ellagic acid, its derivatives, quercetin and myricetin.

The gum is mainly the calcium salt of a complex, high molecular weight polysaccharic acid (ghattic acid). The gum is a substitute for Gum arabic.

Anthemis nobilis Linn.

Synonym ► *Chamaemelum nobile* (L.) Allioni.

Family ► *Asteraceae.*

Habitat ► The temperate regions of the Himalayas. Wild at several places.

English ► Roman Chamomile, Double Chamomile.

Unani ► Gul-e-Baabuuna.

Siddha/Tamil ► Shimai chamantipu.

Action ► Mild sedative, anticonvulsant, antispasmodic, anti-inflammatory, mild analgesic; used externally for skin disorders, poultice of flowers in sprains and rheumatism.

Key application ► Used mainly in France for mild spasmodic gastrointestinal disturbances and sluggishness of bowels, also for nervousness. (*PDR.*) (German Chamomile has been included by *German Commission E* among approved herbs, whereas Roman

chamomile remains unapproved due to lack of clinical evidence.) *The British Herbal Pharmacopoeia* recognizes antispasmodic activity of *Anthemis nobilis*.

The flower heads contain volatile oil (including azulenes and bisabolol); sesquiterpene lactone (nobilin); flavonoids, cyanogenic glycoside, bitter glucoside (anthemic acid); acetylenic salicylic derivatives, coumarins (including scopolin), valerianic acid; tannins.

Azulenes and bisabolol are anti-inflammatory and antispasmodic, reducing histamine-induced reactions, including hay fever and asthma. Flavonoids, especially anthemidin, are also antispasmodic. Valerianic acid and cyanogenic glycosides are sedative.

Anthocephalus cadamba Miq.

Synonym ► *A. indicus* A. Rich. *A. chinensis* (Lam.) A. Rich. ex Walp.

Family ► *Rubiaceae*.

Habitat ► Assam, Bengal, southwards to Andhra Pradesh and western Ghats.

English ► Kadam.

Ayurvedic ► Kadamba, Priyaka, Vrtta-pushpa, Nipa, Halipriya. Kadambaka is equated with Adina cordifolia.

Siddha/Tamil ► Venkadambu, Vellai Kadambam.

Action ► Stembark—febrifugal, antidiuretic, anthelmintic, hypoglycaemic. Fruit—cooling; anticatarrhal, blood purifier, analgesic. Flowers and root—abortifacient. Leaves—astringent. A decoction is used for gargling in stomatitis and aphthae.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of dried stembark in disorders of female genital tract and bleeding disorders.

The dried bark contains alkaloids, steroids, reducing sugars and also tannins (4.61%). The ether-soluble alkaloid of the bark shows antibacterial activity.

Dosage ► Stembark—0.5–1.5 g powder. (*API* Vol. II.)

Antiaris toxicaria Lesch.

Family ► *Moraceae*.

Habitat ► Western Ghats from Konkan southwards to Trivandrum, up to 600 m.

English ► Sacking tree, Upas tree.

Ayurvedic ► Valkala vrksha.

Siddha/Tamil ► Aranthelli, Mara-uri, Nettavil.

Folk ► Jangali Lakuch, Jasund, Chaandakudaa.

Action ► Seed—febrifuge, antidysenteric (in minute doses). Latex—circulatory stimulant (in minute doses.)

The latex contains a series of poisonous cardenolides, of which alpha- and/or beta-antiarin are the main components. The total amount of crystalline cardiac glycosides in the latex

A

ranges from 0.1 to 2.5%; alpha-antiarin from 0.0 to 1.38% and beta-antiarin from 0.075 to 1.44%. Antiarins are said to act on the heart more powerfully than digitalin. Beta-antiarin is more potent than alpha-antiarin.

Latex, in small quantities, is a mild cardiac and circulatory stimulant, whereas in large quantities it acts as a myocardial poison. It stimulates intestinal and uterine contractions.

As many as 34 Kedde-positive substances were reported in the seed sample from Indonesia. The latex sample showed the presence of 29 Kedde-positive substances.

Aphanamixis polystachya (Wall.) Parker.

Synonym ▶ *Amoora rohituka* W. and A.

Family ▶ *Meliaceae.*

Habitat ▶ The sub-Himalayas tracts, Sikkim, Assam, Bengal, western Ghats and the Andamans.

Ayurvedic ▶ Rohitaka, Daadima-chhada, Daadima-pushpaka, Plihaghna. *Tecoma undulata* G. Don., *Bignoniaceae*, is also equated with Rohitaka.

Siddha/Tamil ▶ Malampuluvan.

Action ▶ Bark—strongly astringent, used in the diseases of the liver and spleen, and for tumours, enlarged glands. Seed oil—used in muscular pains and rheumatism. All parts of the plant exhibit pesticidal activity. Seed extract—antibacterial, antifungal.

An aqueous extract of the bark, when injected i.p. in normal guinea pigs, showed reduction in absolute lymphocyte count and an increase in spleen weight. The bark appears to be an effective immunosuppressive drug similar to prednisolone.

The stembark contains a limonoid, ammorinin and a saponin, poriferasterol-3-rhamnoside.

Apium graveolens Linn.

Family ▶ *Umbelliferae; Apiaceae.*

Habitat ▶ Native to Europe; cultivated in northwestern Himalayas and in hills of Uttar Pradesh, Himachal Pradesh and southern India.

English ▶ Celery.

Ayurvedic ▶ Ajmodaa, Ajmoda, Ajmodikaa, Dipyaka.

Unani ▶ Karafs.

Siddha/Tamil ▶ Celery-keerai.

Folk ▶ Ajmodaa.

Action ▶ Anti-inflammatory (used in rheumatic disorders, inflammation of the urinary tract), diuretic, carminative, nervine, sedative, antiemetic, antispasmodic, antiseptic (used in bronchitis, asthma, as well as liver and spleen diseases), emmenagogue. Essential oil from seeds—tranquilizer, anticonvulsant, antifungal. Seeds are used in the treatment of chronic skin disorders including psoriasis.

Key application ▶ As diuretic. (*The British Herbal Pharmacopoeia.*)

Celery yields an essential oil (3%), major constituent being *d*-limonene (50%) and phathalides and beta-selinene; coumarins, furanocoumarins (bergapten); flavonoids (apiin and apigenin). Alkaloid fraction of seeds showed tranquilizing activity in animals. The phthalides are sedative in mice and exhibit antiepileptic activity in rats and mice. The aqueous extract of the celery has been shown to reduce adjuvant-induced arthritis in rats, and to be hypotensive in patients as well as animals. The tincture of the plant exhibits drop in blood pressure accompanied by an increase in urine output.

Apium leptophyllum (Pers.) F. Muell. ex Benth.

Family ► *Umbelliferae.*

Habitat ► Native to America; cultivated in Andhra Pradesh, Gujarat, Madhya Pradesh, Karnataka.

Ayurvedic ► Ajmodaa, Dipyaka.

Unani ► Ajmod, Karafs-e-Hindi.

Siddha ► Omam.

Action ► See *Apium graveolens*.

The essential oil contains Meethers of thymol, carvacrol and thymoquinol; used as a carminative. The oil shows strong antifungal activity against *Candida albicans*, and moderate activity against Gram-positive and Gram-negative bacteria.

Dosage ► Dried fruit—3–6 g powder. (*API* Vol. II.)

Aquilaria agallocha Roxb.

Synonym ► *A. malaccensis* Lamk.

Family ► *Thymelaceae.*

Habitat ► The hills of Assam, Meghalaya, Nagaland, Manipur and Tripura.

English ► Aloewood, Eaglewood, Agarwood.

Ayurvedic ► Aguru, Krimij, Krishnaaguru, Jongaka, Maaliyaka, Loha, Kaalaloha, Asitaka.

Unani ► Ood-ul Hindi, Ood Gharqi.

Siddha/Tamil ► Akil kattai, Agil.

Action ► Heartwood—astringent, carminative, antiasthmatic, antidiarrhoeal, antidysenteric; used in gout, rheumatism and paralysis; as a stimulant in sexual debility; as a liniment in skin diseases.

The agarwood or eaglewood of commerce is derived from the fungus-infected tree through wounds caused by the species of *Aspergillus*, *Fusarium*, *Penicillium*, and also by some of *Fungi Imperfecti*. Agarwood on distillation yields an essential oil, known as Agar Oil.

The essential oil yields a number of agarofurans, sesquiterpene alcohols and spirosesquiterpene alcohols.

The stemwood yields sesquiterpenoids—gmelofuran and agarol; also a coumarinolignan—aquillochin.

(Agar is a different drug—extract of a seaweed, *Gelidium Amansii*, used as a mild laxative.)

Dosage ► Heartwood—1–3 g powder. (*API* Vol. IV.)

A

Arachis hypogaea Linn.

Family ► *Papilionaceae*; *Fabaceae*

Habitat ► Native to Brazil, but widely grown for its pods in southern India, Maharashtra and Gujarat.

English ► Groundnut, Peanut, Monkeynut.

Ayurvedic ► Mandapi, Tailamudga, Bhuumimudga.

Unani ► Moongphali.

Siddha/Tamil ► Nelakadalai, Verkadalai.

Action ► Kernels—contain protease inhibitors. Peanut skin—haemostatic.

There is a haemostatic principle in the peanut flour, which is said to improve the condition of haemophiliacs. The protease inhibitor acts on the fibrinolytic system, primarily as an antiplasmin. It is reported to form complexes not only with the enzymes, but also with the corresponding zymogens.

The peanut (red) skin contains bioflavonoids, which possess vitamin–P activity; tannins; a lipoxidase and a protease inhibitor. Capric acid, obtained from the (red) skin, showed antifungal activity against *Aspergillus niger*.

Aralia binnatifida (Seem.) Clarke.

Synonym ► *A. pseudo-ginseng* Wall. ssp. *himalaicus* Hara.

Family ► Araliaceae.

Habitat ► Nepal, Sikkim and Bhutan, Khasi Hills.

Folk ► Taapamaari (Maharashtra).

Action ► Stimulant, aphrodisiac, antipyretic, dyspeptic, expectorant.

Arctium lappa Linn.

Family ► *Compositae*; *Asteraceae*.

Habitat ► Native to northern Europe; now found in western Himalayas, Kashmir and Simla.

English ► Common or Great Burdock.

Folk ► Phaggarmuul (Kashmir).

Action ► Hypoglycaemic (plant extract caused reduction of blood sugar with an increase in carbohydrate tolerance). Roots—inhibitory of tumour growth, cardiac stimulant, diuretic, spasmolytic. Leaves and seeds—anticutaneous (used in psoriasis, seborrhoic eczema).

Key application ► As dermatological agent. (*The British Herbal Pharmacopoeia*.)

Important constituents of Burdock roots are fatty acids, organic acids, phenolic acids, lignans, sesquiterpenes, tannin, inulin and mucilage.

Extracts of the fruit are reported to have hypoglycaemic activity in rats. Arctigenin (lignan) is a weak inhibitor of experimental tumour growth. The antimicrobial properties are due to polyacetylenes (of the root). The root exhibits antibiotic activity against *Staphylococcus*, and is used for fungal and bacterial infections. A flavonoid, arctiin, shows smooth muscle relaxant properties.

Arctostaphylos uva-ursi Spreng.

Family ► *Ericaceae.*

Habitat ► Native to North America, Europe and Asia.

English ► Bearberry.

Unani ► Inbud-dub, Angur-e-khiras, Reechh Daakh.

Action ► Astringent, dirutic; used for urinary tract infections, dysuria, cystitis, urethritis, pyelitis.

The leaves gave 0.8–1% of a flavanol glucoside, isoquercitin, arbutin and methyl arbutin. Total arbutin content varies from 7.5 to 10.7%; tannins 15 to 20%. Arbutin hydrolyses to hydroquinone, a urinary antiseptic.

Arbutin is antimicrobial, but the crude extract of uva-ursi is more effective than isolated arbutin. In rats, uva-ursi showed anti-inflammatory activity against experimentally induced inflammation. (*Natural Medicines comprehensive Database,* 2007.)

Areca catechu Linn.

Family ► *Palmae*; *Arecaceae*.

Habitat ► Native to Malaysia; now grown along the coasts of Karnataka, Kerala, Tamil Nadu, West Bengal, Assam and Maharashtra.

English ► Arecanut, Betel Nut.

Ayurvedic ► Puuga, Puugi, Kramuka, Ghontaa, Guwaak, Ghorant.

Unani ► Fufal, Chhaalia, Supaari.

Siddha/Tamil ► Kottai Paakku, Kamugu.

Action ► Taeniacide (confined to veterinary medicine), astringent, stimulant.

Along with other therapeutic application, *The Ayurvedic Pharmacopoeia of India* indicates the use of dried ripe seed in leucorrhoea and vaginal laxity.

Arecanut contains several alkaloids belonging to pyridine group, the most important being arecoline (0.1–0.5%). Arecaidine, guvacine and isoguvacine are also present. Arecoline is anthelmintic (in animals, not in humans). Arecaidine has no parasympathomimetic effects, but only stimulating properties; sedative in higher doses. Isoguvacine produces hypotension.

Contraindicated in asthma due to bronchoconstrictive effects of the alkaloid arecoline (human case reports). (Francis Brinker.)

Arecanut tannins (8.0–18.0%) are predominantly catechol tannins which closely resemble Mimosa bark tannins. Powdered nuts are prescribed in diarrhoea and urinary disorders. In combination with other astringent and styptic herbs, arecanut is used as a major constituent in confections of Indian medicine for gynaecological disorders.

Aqueous extract of the nut exhibits direct vasoconstriction and adrenaline potentiation in rats. Antimicrobial activity is due to polyphenolic fraction. Tannins potentiated the action of acetylcholine in ileum and uterus of rat and noradrenaline on seminal vesicle at low concentration.

Due to increased incidence of oral cancer associated with betel chewing, the use of arecanut as a masticatory is being discouraged.

A

Seeds are toxic at 8–10 g, fluid extract at 3.7 ml; and arecoline hydrobromide at 4.3–6.5 mg. (Francis Brinker.)

Dosage ► Dried ripe fruit—1–2 g powder. (*API* Vol. I.)

Argemone mexicana Linn.

Family ► *Papaveraceae.*

Habitat ► Native to America; naturalized throughout India.

English ► Prickly Poppy, Mexican Poppy.

Ayurvedic ► Katuparni, Svarnkshiri, Kaanchan-kshiri, Pitadugdhaa. Hemaahvaa, Himaavati, Hemavati. (Not to be equated with Brahmadandi—*Tricholepis glaberrima*.)

Unani ► Satyaanaashi.

Siddha/Tamil ► Piramathandu, Kudiyotti.

Action ► Seed—responsible for epidemic dropsy. Causes diarrhoea and induces toxicity. Oil, leaf juice and root—used externally for indolent ulcers and skin diseases.

The herb contains isoquinoline alkaloids. The fresh latex contains protein-dissolving constituents and is used externally to treat warts, tumours and cancer. Latex contains alkaloid berberine (0.74%), protopine (0.36%) and free amino acids. Sanguinarine is the toxic factor in seeds.

Argyreia speciosa Sweet.

Synonym ► *A. nervosa* (Burm. f.) Boj.

Family ► *Convolvulaceae.*

Habitat ► Found all over India, ascending to 300 m.

English ► Elephant Creeper.

Ayurvedic ► Vriddhadaaruka, Vriddhadaaru, Vriddhadaaraka, Bastaantri, Sthavira, Sthaviradaaru, Atarunadaaru, Samudrashosha. (Seeds of Salvia plebeia R. Br. are also known as Samudrashosha.)

Unani ► Samunder sokh.

Siddha/Tamil ► Ambgar, Samuddira-pacchai

Folk ► Bidhaaraa.

Action ► Root—aphrodisiac (considered as a rejuvenator), nervine (used in diseases of nervous system, sexual disorders), diuretic (used in strangury), antirheumatic. Seeds—hypotensive, spasmolytic. Leaves—used externally in skin diseases (ringworm, eczema, boils, swellings); rubefacient, topically stimulant.

The seeds contain hallucinogenic ergoline alkaloids, the main ones being ergine and isoergine. EtOH (50%) extract of seeds exhibits hypotensive activity. (Seeds of all species of *Argyreia* contain ergoline alkaloids and are hypotensive.) Leaves of *Argyreia* sp. contain sitosterol and are antiphlogistic.

In Indian medicine, *A. speciosa* is not used as a single drug for sexual disorders in men, but as a supporting drug for exerting its antiphlogistic, spasmolytic and hypotensive actions on the central nervous system. The

drug, in itself, did not show anabolic-cum-androgen-like or spermogenetic activity experimentally.

Ipomoea petaloidea Chois and *Ipomoea biloba* Forsk of the *Convolvulacae* family are also used as Vriddhadaaru.

In Western herbal medicine, Hawaiian Baby Woodrose is equated with *Argyreia nervosa* (synonym *Argyreia speciosa*; grows in Florida, California and Hawaii). The seed is used for pain relief and as a hallucinogen.

The seeds contain hallucinogens including ergonovine, isoergine (isolysergic acid amide) and ergine (lysergic acid amide). Four to eight seeds are equivalent to 10–100 mcg of LSD, a potent serotonin-1A (5-HT1A) agonist. The effects last 6–8 h. (*Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Aristolochia bracteolata Lam.

Synonym ► *A. bracteata* Retz.

Family ► *Aristolochiaceae.*

Habitat ► Uttar Pradesh, Bengal, Madhya Pradesh and western peninsular India.

English ► Bracteated Birthwort.

Ayurvedic ► Kitamaari, Dhumrapatraa, Naakuli.

Unani ► Kiraamaar.

Siddha/Tamil ► Aadutheendaappaalai, Kattusuragam.

Action ► Oxytocic, abortifacient, emmenagogue.

Leaves and fruit contain ceryl alcohol, aristolochic acid and beta-sitosterol. Aristolochic acid is insecticidal, poisonous, nephrotoxic. Leaf juice—vermifuge. Seeds—strong purgative. Products containing aristolochic acid are banned in the U.S., Canada, Great Britain, European countries and Japan.

The seed compounds, aristolochic acid and magnoflorine, induce contractions in the isolated uterus of pregnant rat and stimulate the isolated ileum of guinea pig. They also activate the muscarinic and serotonergic receptors in a variety of organs. Magnoflorine decreases arterial blood pressure in rabbits, and induces hypothermia in mice.

See also *A. longa*.

Aristolochia indica Linn.

Family ► *Aristolochiaceae.*

Habitat ► Throughout the country, mainly in the plains and lower hilly regions.

English ► The Indian Birthwort.

Ayurvedic ► Ishvari, Gandhnaakuli, Naagadamani, Arkamuula.

Unani ► Zaraavand-Hindi.

Siddha/Tamil ► Adagam.

Folk ► Isarmuula, Isrola.

Action ► Oxytocic, abortifacient, emmenagogue.

Aristolochia sp. contain aristolochic acids and aristolactams.

A

Aristolochia longa Linn.

Family ► *Aristolochiaceae.*

English ► European Birthwort.

Unani ► Zaraawand Taweel.

Action ► Oxytocic, abortifacient, emmenagogue.

Aristolochic acid and its Me ester—strongly abortifacient, showed damage to liver and kidney. Roots—anti-oestrogenic. A cytotoxic lignan, savinin, has been isolated from the roots.

Aristolochic acid also has an effect against adenosarcoma and HeLa cells in culture; however, it is suspected to be carcinogenic.

Aristolochia extracts show a pronounced enhancement of phagocytosis by leucocytes, granulocytes and peritoneal macrophages, due to the presence of aristolochic acids.

Tardolyt-coated tablets, which contain 0.3 mg of aristolochic acid, increase phagocytosis in healthy men.

Aristolochic acid also exhibits reduction of some of the toxic effects of prednisolone, chloramphenicol and tetracycline in experiments in vitro, and a reduction in the rate of recurrent herpes lesions *in vivo*.

Armoracia lapathifolia Gilib.

Synonym ► *A. rusticana* Gaertn et al.

Family ► *Cruciferae*; *Brassicaceae.*

Habitat ► Native to Europe; grown in gardens in northern India and in hill stations of southern India.

English ► Horseradish.

Action ► Circulatory stimulant, diaphoretic, diuretic, antibiotic. Used for both urinary and respiratory tract infections. Root—liver, spleen and pancreatic stimulant; an alternative to Cayenne pepper; urinary antiseptic; diuretic; used in the treatment of gout, increases excretion of uric acid; also for proteinura and vaginal discharges. An infusion is used for hepatitis.

Key application ► In catarrhs of the respiratory tract and as a supportive therapy for infections of the urinary tract; externally for catarrhs of the respiratory tract and hyperaemic treatment of minor muscle aches. (*German Commission E.*) It is contraindicated in stomach and intestinal ulcers and kidney disorders; not to be administered to children under 4 years.

The root contains glucosinolates, mainly sinigrin, which releases allyl isothiocyanate on contact with the enzyme myrosin during crushing. The oil exhibits broad-spectrum antibiotic activity due to allyl isothiocyanates and allied compounds; used internally as stimulant, sudorific and diuretic. Antibiotic activity is stronger against Gram-positive bacteria than against Gram-negative bacteria. The oil also exhibits cytotoxic activity.

The root produces an inhibitory effect on the growth of Gram-negative bacteria of the typhoid-paratyphoid-entertitis group.

Kaempferol, a component of Horseradish, inhibits thyroid peroxidase, which is involved in the biosynthe-

sis of thyroid hormone. (Sharon M. Herr.)

Arnebia benthamii
(Wall. ex G. Don) Johnston.

Synonym ► *Macrotomia benthamii* A. DC.

Family ► *Boraginaceae.*

Habitat ► The alpine Himalayas from Kashmir to Kumaon, at altitude of 3,000–3,900 m, and in Nepal.

Folk ► Kashmiri Gaozabaan, Kashmiri Kahzabaan.

Action ► Stimulant, cardiac tonic, expectorant, diuretic (syrup and jam, used in diseases of the mouth and throat, also in the treatment of fevers and debility.) The roots possess antiseptic and antibiotic properties.

Artabotrys hexapetalus
(Linn. f.) Bhandari.

Synonym ► *A. odoratissimus* R. Br.

Family ► *Annonaceae.*

Habitat ► Southern India, largely grown in gardens.

Ayurvedic ► Panasagandhi, (Harit) Champaka.

Siddha/Tamil ► Manoranjidam.

Folk ► Haraa champaa (north), Kathari champaa; Hirvaa champaa (Maharashtra).

Action ► Cardiac stimulant, uterine stimulant, muscle relaxant.

The extract of the pericarp showed a positive ionotropic and chronotropic effect on all types of experimental animals. The cardiac stimulant and uterine stimulant activity is attributed to the glycosides, whereas the relaxant action on plain muscles and hypotensive effect, which could be partly cholinergic and partly resulting from vasodilatory action, are probably due to the presence of the volatile oil.

The leaves are found to contain an antifertility principle. The root contains an antimalarial agent.

Artemisia absinthium Linn.

Synonym ► *Absinthium vulgare* Gaertn.
A. officinale Lam.

Family ► *Compositae*; *Asteraceae.*

Habitat ► Kashmir at altitudes of 1500–2100 m.

English ► Wormwood, Maderwood.

Unani ► Afsanteen, Vilaayati Afsanteen.

Siddha/Tamil ► Machipatri.

Folk ► Mastiyaaraa (Punjab), Titween (Kashmir).

Action ► Choleretic (bile and gastric juice stimulant), anthelmintic, stomachic, carminative, antispasmodic, anti-inflammatory, emmenagogue, mild antidepressant; used in chronic fevers.

Key application ► In loss of appetite, dyspepsia, biliary dyskinesia. (*German Commission E.*) In anorexia, for example, after illness, and

A

dyspeptic complaints. (*ESCOP*.) It is contraindicated in gastric and duodenal ulcers. Excessive doses may cause vomiting, severe diarrhoea, retention of urine or dazed feeling and central nervous system disturbances. (*ESCOP*.)

The herb contains a volatile oil of variable composition, with alpha- and beta-thujone as the major component, up to about 35%; sesquiterpene lactones (artabasin, absinthin, anabsinthin); azulenes; flavonoids; phenolic acids; lignans.

Thujone is a toxic constituent which shows hallucinogenic and addictive activity found in Indian hemp. It stimulates the brain; safe in small doses, toxic in excess. The azulenes are anti-inflammatory. The sesquiterpene lactones exhibit an antitumour effect and are insecticidal and anthelmintic.

Essential oil from leaves—antibacterial, antifungal. The oil is toxic at 10 ml.

Artemisia maritima Linn.

Family ► *Compositae*; *Asteraceae*.

Habitat ► The western Himalayas from Kashmir to Kumaon.

English ► Wormseed, Santonica.

Ayurvedic ► Chauhaara, Kirmaani Yavaani, Chuhaari Ajawaayin; not related to Ajawaayin.

Unani ► Dirmanah, Kirmaalaa, Afsanteen-ul-bahar. (Dirmanah Turki is equated with *A. stechmanniana* Besser.)

Folk ► Kirmaani Ajawaayin, Kirmaani-owaa, Kirmaani-ajmo.

Action ► Deobstructant, stomachic, anthelmintic (effective against roundworms), antifungal.

A decoction of the fresh plant is given in cases of intermittent and remittent fever.

A. maritima var. *thomsoniana* C. B. Clarke is a santonin-yielding var.; *A. maritima* var. *fragrans* (Willd.) Ledeb. is a non-santonin var.

Immature flowerheads and leaves contain santonin. Roots, stems and twigs are devoid of santonin. Santonin, a sesquiterpene lactone, is used for the treatment of ascaris and oxyuris infections. Large doses (0.3 g is adults and 0.06 in children) are toxic.

Beta-santonin is less anthelmintic in action than santonin; pseudosantonin is devoid of anthelmintic property.

Studies is albino mice revealed that santonin had no androgenic, estrogenic, antiestrogenic, progestational and antiprogestational effects.

Santonin is toxic at 60 mg in children; 200 mg in adults. (Francis Brinker.)

Dosage ► Whole plant—3–6 g powder. (*CCRAS*.)

Artemisia vestita Wall. ex DC.

Family ► *Compositae*, *Asteraceae*.

Habitat ► Western Himalayas at 2,100–3,000 m.

Ayurvedic ► Gangaa Tulasi.

Folk ► Kundiyaa, Chamariyaa.

A

Action ► Leaf—haemostatic. Essential oil—antibacterial, antifungal (in 1:1000 dilution).

The major components of the essential oil from leaves and flowering tops are alpha-terpinene, thujyl alcohol, terpenyl acetate, nerol, phellandrene, cineol, neral, thujyl acetate, beta-thujone and artemisol.

Related sp., known as Gangaa Tulasi, are *Artemisia lacrorum* Ledeb. and *A. parviflora* Wight.

Artemisia vulgaris Linn. var. nilagirica Clarke.

Synonym ► *A. nilagirica* (Clarke) Pamp.

Family ► *Compositae*; *Asteraceae*.

Habitat ► The hilly regions of India, also in Mount Abu in Rajasthan, in western Ghats, and from Konkan southward to Kerala.

English ► Indian Wormwood, Fleabane, Dungwort, Mugwort, Wild Wormwood.

Ayurvedic ► Damanaka, Pushpachaamara, Gandhotkata. (Related sp.: *A. siversiana* Ehrh. ex Willd.)

Unani ► Afsanteen-e-Hindi. (*National Formularly of Unani Medicine* clubbed it with Baranjaasif.)

Siddha/Tamil ► Maasipattiri.

Folk ► Daunaa, Damanaa.

Action ► Leaf—emmenagogue, menstrual regulator, nervine, stomachic (in anorexia and dyspepsia), anthelmintic, choleretic, diaphoretic. An infusion of flower tops is administered in nervous and spasmodic affections. The herb is also used as an antilithic. Oil from leaves—antibacterial, antifungal in 1:1000 dilution.

Key application ► As emmenagogue. (*The British Herbal Pharmacopoeia*.)

The plant yields about 0.34% of an essential oil. Plants at lower altitude had more percentage of cineol, thujone, thujyl and citral, whereas from higher altitude terpenes are in higher percentage. The highest amount of cineol was reported to be 30%.

The plant is also used as an inferior substitute for cinchona in fevers.

Artocarpus integrifolia Linn. f.

Synonym ► *A. heterophyllus* Lam.

Family ► *Moraceae*.

Habitat ► Cultivated throughout the hotter parts of India.

English ► Jackfruit, Jack tree.

Ayurvedic ► Panasa, Kantakiphala, Ativrihatphala, Aamaashayaphala.

Siddha/Tamil ► Murasabalam.

Folk ► Katahal, Phanasa.

Action ► Latex—bacteriolytic, promotes healing of abscesses. Juice of the plant—applied to glandular swellings and abscesses for promoting suppuration. Root—used for diarrhoea, asthma, skin diseases. Unripe fruit—acrid, astringent. Ripe fruit—cooling, laxative, difficult to digest. Seeds—diuretic. Lactin extraction showed

A

potent and selective stimulation of distinct human T and B cells.

The seed extract stimulates the heart and causes a fall in arterial blood pressure of experimental animals pretreated with physostigmine. The seeds show equal inhibitory activity against trypsin and chymotrypsin. (The activity is destroyed when the seeds are boiled or baked.)

The leaves and stems show presence of sapogenins, and exhibit estrogenic activity.

An aqueous extract of mature leaves exhibited hypoglycaemic activity in experimental animals. Leaves contain cycloartenone, cycloartenol and beta-sitosterol. Heartwood contains flavonoids, artocarpesin and norartocarpetin and their structures.

Dosage ► Fruit—50–100 ml decoction. (*CCRAS*.)

Artocarpus lacucha Buch.-Ham.

Synonym ► *A. lakoocha* Roxb.

Family ► *Moraceae*.

Habitat ► Cultivated in Uttar Pradesh, Bengal, Khasi Hills and western Ghats.

English ► Monkey Jack.

Ayurvedic ► Lakuch, Kshudra Panas, Granthiphala, Pitanaasha.

Siddha/Tamil ► Ilangu, Irapala, Ottipilu (Tamil).

Folk ► Badhar.

Action ► Bark—when applied externally, draws out purulent matter; heals boils, cracked skin and pimples. Seeds—purgative, haemagglutinating. Stems—vermifuge.

The stembark contains oxyresveratrol, used for tapeworm.

A lectin, artocarpin, isolated from seeds, precipitates several galactomannans. It agglutinates rat lymphocytes and mouse ascites cells.

Dosage ► Fruit—5–10 ml juice. (*CCRAS*.)

Arundo donax Linn.

Family ► *Gramineae*; *Poaceae*.

Habitat ► Native to Mediterranean region; found in Kashmir, Assam and the Nilgiris, also grown in hedges.

English ► Great Reed, Spanish-Bamboo-Reed, Giant-Bamboo-Reed.

Ayurvedic ► Nala, Potgala, Shuunyamadhya, Dhamana.

Siddha/Tamil ► Korukkai.

Action ► Rhizome—sudorific, emollient, diuretic, antilactant, antidropsical; uterine stimulant (stimulates menstrual discharge), hypotensive.

The rhizome yields indole-3-alkylamine bases, including bufotenidine and dehydro-bufontenine. The leaves yield sterols and triterpenoids.

Bufotenidine possesses antiacetylcholine properties, histamine release

activity and is a uterine stimulant. Alkaloids from the flowers produced curarimetic effect of the non-polarizing type.

Dosage ► Root—50–100 ml decoction. (*CCRAS*.)

Asarum europaeum Linn.

Family ► *Aristolochiaceae*.

Habitat ► Indigenous to the northern parts of southern Europe, Central and East-Central Europe; cultivated in the United States. A related sp., *Asarum himalaicum*, synonym *A. canadense*, is reported from the eastern Himalayas.

English ► Asarbacca, Hazelwort, Wild Nard.

Unani ► Asaaroon, Subul-e-Barri, Naardeen-Barri.

Folk ► Tagar Ganthodaa.

Action ► Brain and nervine tonic, diuretic, deobstructant and anti-inflammatory; used in bronchial spasm and in preparations of cephalic snuffs.

The volatile oil (0.7–4%) consists of asarone up to 50%, asaraldehyde 2–3%, methyleugenol 15–20%, with bornyl acetate, terpenes and sesquiterpenes. Asarone and its beta-isomer is found to be carcinogenic in animals. The rhizome, in addition, contains caffeic acid derivatives and flavonoids.

A related sp., *Asarum canadense* L., indigenous to North America and China, contains a volatile oil (3.5–4.5%) with methyl eugenol (an important constituent of *A. europaeum*), and also aristolochic acid. (Aristolochic acid is carcinogenic and nephrotoxic.) *Asarum* sp. are not used as a substitute for ginger.

Asclepias curassavica Linn.

Family ► *Asclepiadaceae*.

Habitat ► Naturalized in many parts of India as an ornamental.

English ► Curassavian Swallow-Wort, West Indian Ipecacuanha, Blood-Flower.

Ayurvedic ► Kaakanaasikaa (substitute).

Folk ► Kaakatundi (Kashmir).

Action ► Spasmogenic, cardiotonic, cytotoxic, antihaemorrhagic, styptic, antibacterial. Various plant parts, as also plant latex, are used against warts and cancer. Root—used as an astringent in piles. Leaves—juice, antidysenteric, also used against haemorrhages. Flowers—juice, styptic. Alcoholic extract of the plant—cardiotonic.

An alcoholic extract of the Indian plant has been reported to contain a number of cardenolides, including calactin, calotropin, calotropagenin, coroglaucigenin, uzarigenin, asclepin, its glucosides and uzarin. Asclepin, the chief active principle, is spasmogenic and a cardiac tonic, having longer duration of action than digoxin (96 h in cat, as opposed to the 72 h of digoxin). Calotropin exhibits cytotoxic activity.

A

Pleurisy root of the U.S. is equated with *Asclepias tuberosa*. It is used for cold, flu and bronchitis in Western herbal medicine.

Toxic principles of the herb include galitoxin and similar resins, and glucofrugoside (cardenolide). Toxicity is reduced by drying.

Asparagus adscendens Roxb.

Family ► *Asparagaceae*.

Habitat ► The western Himalayas and Punjab, from Himachal Pradesh to Kumaon, up to 1,500 m.

Ayurvedic ► Mushali, (white var.), Mahaashataavari. The black variety is equated with Taalamuuli, *Chlorophytum arundinaceum* Baker.

Unani ► Shaqaaqul-e-Hindi.

Action ► A substitute for *A. officinalis*.

The root yields asparagin. Sapogenins A and B, isolated from the root, were identified as stigmasterol and sarsasapogenin.

Asparagus officinalis Linn.

Family ► *Asparagaceae*.

Habitat ► Native to Europe and West Asia.

English ► Asparagus, Sparrow grass.

Ayurvedic ► Shataavari, Vari, Shatviryaa, Shatmuuli, Shatpadi, Bhiru, Naaraayani, Bahusutaa, Atirasaa.

Unani ► Haliyun.

Action ► Diuretic, laxative, cardiotonic, sedative, galactagogue; used for neuritis and rheumatism, as well as for cystitis and pyelitis.

Key application ► In irrigation therapy for inflammatory diseases of the urinary tract and for prevention of kidney stones. (*German Commission E.*). It is contraindicated in kidney diseases and oedema because of functional heart.

The root contains steroidal glycosides (asparagosides) and bitter glycosides; asparagusic acid and its derivatives; asparagines, arginine and tyrosine; flavonoids, including rutin, kaempferol and quercetrin; polysaccarides and inulin. Asparagine is a strong diuretic source of folic acid and selenium.

A spirostanol glycoside, isolated from the methanolic extract of the fruits, has shown 100% immobilization of human spermatozoa.

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Asparagus racemosus willd.

Family ► *Asparagaceae*.

Habitat ► Found wild in tropical and subtropical parts of India, including the Andamans and ascending in the Himalayas to 1,500 m.

English ► Indian asparagus.

Ayurvedic ► Shataavari, Shatmuuli, Atirasaa, Bahusutaa, Shatpadi, Shatviryaa, Bhiru, Indivari,

Vari. (Substitute for Medaa, Mahaamedaa.)

Unani ► Sataavar.

Siddha/Tamil ► Thanneervittan kizhangu, Sataavari Kizhangu.

Action ► Used as a galactagogue and for disorders of female genitourinary tract; as a styptic and ulcer-healing agent; as an intestinal disinfectant and astringent in diarrhoea; as a nervine tonic, and in sexual debility for spermatogenesis.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicates the use of the tuberous root in gout, puerperal diseases, lactic disorders, haematuria, bleeding disorders and also recommends it for hyperacidity.

The plant contains saponins—shatavarins I–IV. Shatavarin IV is a glycoside of sarsasapogenin. The saponin in doses of 20–500 mcg/ml produces a special blockade of syntocinon (oxytocin)-induced contraction of rat, guinea-pig and rabbit uteri in vitro and in situ. It also blocks the uterine spontaneous motility.

The dried root yields sitosterol; 4,6-dihydroxy-2–O-(2' hydroxyisobutyl) benzaldehyde and undecanyl cetanoate, and contains a large amount of saccharine matter, mucilage and minerals—Ca (0.172), Cu (0.033), Na (14.60), K (8.32), Mg (0.169), Mn (0.0074), Ni (0.105) and Zn (0.072) mg/g(dry weight).

The root was found to reduce gastric emptying time comparable to that of metoclopramide. (*J Postgrad Med*, 1990, 36(2), 91–94).

The root extracts exhibited antiallergic activity in animal studies.

The root, when fed orally, acted as immunomodulator against induced sepsis and peritonitis in rats and mice.

Asparagus sarmentosus Linn. has been equated with Mahaa-shataavari. Other related sp. are *Asparagus curillus* Buch.-Ham., *A. filicinus* Buch.-Ham. and *A. gracilis* Royle.

Dosage ► Dried root—3–6 g powder. (*API* Vol. IV.)

Asphodelus fistulosus Linn.

Synonym ► *A. tenuifolius* Cav.

Family ► *Liliaceae*.

Habitat ► Most parts of the plains from West Bengal westwards to Punjab and Gujarat, as a field weed.

English ► Asphodel.

Unani ► Piyaazi, Khunsaa, Asraash. (*Asphodelus tenuifolius* Cav. is equated with Shellot, Gandanaa.)

Folk ► Bokat.

Action ► Seeds—diuretic; applied externally to ulcer and inflamed parts.

Seeds contain an ester, 1-O-17-methylstearylmyoinositol. The seed oil yields myristic, palmitic, oleic, linoleic, linolenic acids, beta-amyrin and beta-sitosterol. The oil, due to its high linolenic content (62.62%), may be of therapeutic value in preventing atherosclerosis.

The mineral elements present in the weed are iron 178.4, zinc 44.5 and copper 6.4 ppm. A triterpenoid, lupeol and quercetin are also present.

A

Aspidopterys indica Hochr.

Synonym ► *A. roxburghiana* A. Juss.

Family ► *Malpighiaceae.*

Habitat ► Eastern Himalayas, Assam, Meghalaya, Orissa and peninsular India.

Folk ► Chuttakulaa-tigaa (Telugu).

Action ► The extract of aerial parts—hypotensive.

Asplenium adiantum-nigrum Linn.

Family ► *Aspleniaceae.*

Habitat ► Kashmir at 1500–2000 m and extending to Dalhousie and Chamba in Himachal Pradesh.

English ► Black Spleenwort.

Folk ► Krishna fern.

Action ► Fond—expectorant, pectoral, emmenagogue. Rhizome—anthelmintic. Plant—bitter, diuretic, laxative, anti-inflammatory. It is used for diseases of spleen and in jaundice; produces sterility in women.

The fonds contain aliphatic hydrocarbons, the chief one being hentriacontane, non-acosane and triterpenoid hydrocarbons, mainly of 22 (29)-hopene.

Alcohols, sterols and fatty acids are also reported.

Related sp. include: *A. laciniatum* D. Don (vitamin K3 and phthiocol have been isolated for the first time from the plant); *A. adiantoides* (L.) C. Chr., synonym *A. falcatum* Lam. (used in the treatment of enlarged spleen, in incontenence of urine, in calculus, jaundice and malaria); *A. nidus* Linn. synonym *Thamnopteris nidus* (L.) C. Presl., known as Bird's Nest Fern (used as a depurative and sedative).

Asteracantha longifolia Nees.

Synonym ► *Hygrophila spinosa* T. Anders

Family ► *Acanthaceae.*

Habitat ► Common in moist places, paddy fields, throughout India and Sri Lanka.

Ayurvedic ► Kokilaaksha, Kokilaakshi, Ikshura, Ikshuraka, Kaakekshu, Kshurak, Bhikshu.

Unani ► Taalmakhaanaa. (Wrongly equated with *Euryale ferox* Salisb. (Fox Nut) in *National Formulary of Unani Medicine*, Part I, first edn., 1981.)

Siddha/Tamil ► Neermulli, Nerugobbi.

Action ► Diuretic, used for catarrh of the urinary organs, also for dropsy when accompanied by hepatic obstruction.

The Ayurvedic Pharmacopoeia of India recommends the seed in lithiasis; the whole plant and root for gout.

Aqueous extract of herb ash—diuretic in albino rats. EtOH (50%)—spasmolytic and hypotensive. The herb exhibits antihepatotoxic activity in dogs. Essential oil from whole plant—antibacterial.

The plant gave lupeol, stigmasterol and hydrocarbons; seed gave sterols; flowers, apigenin glucuronide.

Aqueous extract decreased fasting glucose and improved glucose tolerance in rats. (Sharon M. Herr.)

Dosage ► Whole plant—3–6 g, powder; dried seed—3–6 g powder; dried root—3–6 g for decoction. (*API* Vol. II.) Herb ash—1–3 g (*CCRAS*.)

Astragalus candolleanus Royle.

Family ► *Fabaceae*; *Papilionaceae*.

Habitat ► The western Himalayas.

Ayurvedic ► Rudanti, Rudravanti.

Action ► Depurative, bechic, blood purifier (used in skin diseases). Root powder and decoction also used as an adjunct in tuberculosis.

Dosage ► Fruit—3–5 g powder. (*CCRAS*.)

Astragalus gummifer Labill.

Family ► *Fabaceae*; *Papilionaceae*.

Habitat ► Highlands of Asia Minor, Iran, Greece, Syria and Russia.

English ► Tragacanth Gum.

Unani ► Katiraa, Kataad (Gum)

Action ► Demulcent, emollient (used for irritation of the internal mucosa, colitis, dry coughs), laxative. Mucilage used as an application to burns.

The gum contains polysaccharides and proteinaceous polysaccharides. Tragacanthin is water-soluble, consisting of an arbinogalactan and tragacanthic acid. Bassorin is an insoluble methylated fraction (gel). The polysaccharides have been shown to have immunostimulating activity (stimulation of phagocytosis and an increase in plasma cell counts of T-lymphocytes.

Although tragacanth increases weight of stool and decreases gastrointestinal transit time, it does not appear to affect cholesterol triglyceride or phospholipid levels as other soluble fibres do. (*Natural Medicines Comprehensive Database,* 2007.)

Tragacanth has been shown to be active against a variety of tumours. It appears to inhibit growth of cancer cells.

Astragalus hamosus Linn.

Family ► *Fabaceae*; *Papilionaceae*.

Habitat ► Found in the plains of Punjab.

English ► Tonkin bean, Melilot, King's crown, King's clover.

Unani ► Naakhunaa, Ikil-ul-Malik. (It is also equated with *Melilotus alba* Desv. and *Trigonela uncata* Boiss. in *National Formulary of Unani Medicine*.)

Action ► Nervine tonic (used in nervous and catarrhal affections), antirheumatic, anti-inflammatory, emollient, diuretic, galactogenic.

The callus of the plant contains amino acids; roots contain saponins and sterols. The leaves yield 3-nitropropionic acid.

A

Astragalus sarcocola Dymock.

Family ► *Fabaceae*; *Papilionaceae*.

Habitat ► The mountainous regions from Asia Minor to Iraq and Iran.

English ► Sarcocola.

Ayurvedic ► Rudanti (substitute).

Unani ► Anzaroot, Kohal Kirmaani (Gum).

Action ► Gum—antirheumatic, aperient, anthelmintic, emollient.

Astragalus strobiliferus Royle.

Family ► *Fabaceae; Papilionaceae*.

Habitat ► The western Himalayas at 2,400–3,900 m, and Kashmir.

English ► Indian Gum tragacanth.

Action ► Gum—an Indian substitute for tragacanth (*A. gummifer* gum).

Atalantia monophylla (L.) Correa.

Synonym ► *A. floribunda* Wt.

Family ► *Rutaceae*.

Habitat ► Throughout India, especially in Assam, Meghalaya and Andaman Islands.

English ► Wild Lime.

Siddha/Tamil ► Kattu Narangam, Kattu Elumichai.

Folk ► Jungli Nimbu.

Action ► Oil from leaves and berry—antibacterial, antifungal. Leaves—a decoction is applied to cutaneous affections. Fruit—juice, antibilious.

The rootbark yields alkaloids, atalaphylline and its N-methyl derivatives and atalaphyllidine, which have close structural similarities with the antitumour alkaloid, acronycine, and its cogeners. The rootbark also contains the limonoid, atalantin.

The leaf juice forms an ingredient of a compound liniment used in hemiplegia. The essential oil is used in paralysis. The oil contains higher terpene esters belonging to azulene group (29%). (Azulenes impart anti-inflammatory activity.)

Atropa acuminata Royle ex Lindl.

Synonym ► *A. belladonna* auct. non L.

Family ► *Solanaceae*.

Habitat ► Kashmir and Himachal Pradesh up to 2,500 m.

English ► Indian Belladonna, Indian Atropa.

Ayurvedic ► Suuchi.

Unani ► Luffaah, Luffaah-Barri, Yabaruj, Shaabiraj.

Action ► Highly poisonous; sedative, narcotic, anodyne, nervine, antispasmodic (used in paralysis); parkinsonism; encephalitis; carcinoma; spastic dysmenorrhoea; whooping cough, spasmodic asthma; colic of intestines, gall bladder or kidney, spasm of bladder and ureters; contraindicated in enlarged prostate.

Key application ► In spasm and colic-like pain in the areas of

the gastrointestinal tract and bile ducts. (*German Commission E*, *The British Herbal Pharmacopoeia*.) It is contraindicated in tachycardiac arrhythmias, prostate adenoma, glaucoma, acute oedema of lungs.

A. belladonna L. (European sp. Belladonna, Deadly Nightshade) is cultivated in Kashmir and Himachal Pradesh.

The herb contains tropane (tropine) or solanaceous alkaloids (up to 0.6%), including hyoscamine and atropine; flavonoids; coumarins; volatile bases (nicotine).

Tropane alkaloids inhibit the parasympathetic nervous system, which controls involuntary bodily activities; reduces saliva, gastric, intestinal and bronchial secretions, and also the activity of urinary tubules. Tropane alkaloids also increase the heart rate and dilate the pupils. These alkaloids are used as an additive to compound formulations for bronchitis, asthma, whooping cough, gastrointestinal hypermotility, dysmenorrhoea, nocturnal enuresis and fatigue syndrome.

Atropine provides relief in parkinsonism and neurovegetative dystonia.

The root is the most poisonous, the leaves and flowers less, and the berries the least. (Francis Brinker.)

Dosage ► Leaf, root—30–60 mg powder. (*CCRAS*.)

Atylosia goensis Dalz.

Synonym ► *A. barbata* Baker

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Subtropical tract of Assam, Maharashtra and Kerala, up to 1050 m.

Ayurvedic ► Maashaparni (substitute).

Siddha/Tamil ► Peruvidukol.

Action ► Febrifuge, antibilious, antirheumatic (used in consumption and swellings).

Atylosia scarabaeoides (L.) Benth.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Throughout India; up to 1,800 m in the western Himalayas.

Ayurvedic ► Vana-kulattha.

Folk ► Jangli Tur, Kulthi.

Action ► Antidysenteric, anticholerin, febrifuge; also used in anaemia, anasarca and hemiplegia. Seeds—taeniafuge.

A flavone glucoside, atyloside, has been isolated from the leaves.

Avena sativa Linn.

Family ► *Gramineae*; *Poaceae*.

Habitat ► A cereal and fodder crop of Europe and America; also cultivated in India.

English ► Oat, Common oat.

Ayurvedic ► Yavikaa. (Indian sp. is equated with *A. byzantina* C. Koch.)

Unani ► Sult (Silt), Jao Birahnaa, Jao Gandum.

A

Action ► Nervine tonic (used in spermatorrhoea, palpitation, sleeplessness), cardiac tonic (used in debility), stimulant, antispasmodic, thymoleptic, antidepressant (used in menopausal phase). Also used in diarrhoea, dysentery, colitis. Externally, emollient.

Key application ► Oat straw—externally in baths for inflammatory and seborrhoeic skin diseases. (*German Commission E.*) The effect on blood sugar is less than that from most of the fiber-containing herbs and foods. (Sharon M. Herr.)

The seeds contain proteins and prolamines (avenins); C-glycosyl flavones; avenacosides (spirostanol glycosides); fixed oil, vitamin E, starch.

Silicon dioxide (2%) occurs in the leaves and in the straw in soluble form as esters of silicic acid with polyphenols and monosaccharides and oligosaccharides.

Oat straw contains a high content of iron (39 mg/kg dry weight), manganese (8.5 mg) and zinc (19.2 mg).

In an experimental study, oat straw stimulated the release of luteinizing hormone from the adenohypophysis of rats. (*Expanded Commission E Monographs.*)

An alcoholic extract of green oats was tried on opium addicts. Six chronic opium addicts gave up opium completely, two reduced their intake and two showed no change following regular use of 2 ml three times daily (human clinical study). A significant diminishment of the number of cigarettes used by habitual tobacco smokers resulted from using 1 ml (four times daily) of fresh Avena alcoholic extract of mature plants; however, a few studies gave disappointing results. (Francis Brinker.)

Oat polyphenol composition prevented the increase of cholesterol and beta-lipoprotein of blood serum of fasting rabbits. Antioxidant property of the oat flour remains unaffected by heat. Homoeopathic tincture of seeds is used as a nervine tonic. Beta-glucan from the oats stimulated immune functions.

Avenacosides exhibit strong antifungal activity in vitro.

Averrhoa bilimbi Linn.

Family ► *Oxalidaceae*; *Averrhoaceae*.

Habitat ► Native to Malaysia; cultivated throughout the country.

English ► Bilimbi, Tree Sorrel.

Ayurvedic ► Karmaranga (var.).

Unani ► Belambu (a variety of Kamrakh).

Siddha/Tamil ► Pilimbi, Pulichakkai.

Action ► A syrup made from the fruits is used in febrile excitement, haemorrhages and internal haemorrhoids; also in diarrhoea, bilious colic and hepatitis. The fruit is used for scurvy. An infusion of flowers is given for cough.

Averrhoa carambola Linn.

Family ► *Oxalidaceae*; *Averrhoaceae*.

Habitat ► Native to Malaysia; cultivated throughout the warmer parts of India, especially in Kerala.

A

English ▶ Carambola, Star Fruit, Chinese Gooseberry.

Ayurvedic ▶ Karmaranga.

Unani ▶ Khamraq, Karmal.

Siddha/Tamil ▶ Tamarattai.

Folk ▶ Kamarakh.

Action ▶ Root—antidote in poisoning. Leaf and shoot—applied externally in ringworm, scabies, chickenpox. Flower—vermicidal. Fruit—laxative, antidysenteric, antiphlogistic, febrifuge, anti-inflammatory, antispasmodic (used in hepatic colic, bleeding piles). Seeds—galactogenic; in large doses act as an emmenagogue and cause abortion.

The fruits are a fairly good source of iron but deficient in calcium. They also contain oxalic acid and potassium oxalate. The presence of fluorine is also reported. A wide variation of vitamin-C content (0.3–23.0 mg/100 g) is recorded from different places in India. Sugar (3.19%) consists mainly of glucose (1.63%).

Avicennia officinalis Linn.

Synonym ▶ *A. alba* Blume

Family ▶ *Verbenaceae*; *Avicenniaceae*.

Habitat ▶ A tree occurring in salt marshes and tidal creeks.

English ▶ White mangrove.

Ayurvedic ▶ Tuvara.

Siddha/Tamil ▶ Kandal.

Folk ▶ Tivaria (Gujarat), Upattam (Tamil Nadu).

Action ▶ Stem/bark—astringent. Pulp of unripe fruit—used for healing skin lesions of smallpox; fruits and immature seeds, used as cicatrizant of abscesses and ulcers.

The bark contains 5% tannin, triacontanol and triterpenoids. Kernels contain lapachol, which possesses antitumour activity. Aerial parts yield beta-sitosterol, friedelin, lupenone, lupeol, betulinic and ursolic acids.

Azadirachta indica A. Juss.

Synonym ▶ *Melia azadirachta* Linn.

Family ▶ *Meliaceae*.

Habitat ▶ Native to Burma; found all over India.

English ▶ Neem tree, Margosa tree.

Ayurvedic ▶ Nimba, Nimbaka, Arishta, Arishtaphala, Pichumarda, Pichumanda, Pichumandaka, Tiktaka, Sutiktak, Paaribhadra.

Unani ▶ Aazaad-Darakht-e-Hindi.

Siddha/Tamil ▶ Vemmu, Veppu, Veppan, Arulundi.

Action ▶ Leaf, bark—antimicrobial, antifungal, anthelmintic, insecticidal, antiviral, antipyretic, antimalarial, antiperiodic, mosquito larvicidal, anti-inflammatory, antifertility, spermicidal, hypoglycaemic; used in inflammation of gums, gingivitis, periodonitis, sores, boils, enlargement of spleen, malarial fever, fever during childbirth, measles, smallpox, head scald and cutaneous affections. Oil—used

A

as a contraceptive for intravaginal use, for the treatment of vaginal infections, and as a mosquito repellent.

Plant tetranortriterpenoids have been examined extensively for their antibiotic, antitumour, insecticidal, antibacterial and antifungal activities.

The methanolic extract of the bark shows antimalarial activity against *Plasmodium falciparum*.

The aqueous extract of leaves exhibited antiulcer and anti-inflammatory activity.

The water-soluble portion of alcoholic extract of leaves reduces blood sugar in glucose-fed and adrenaline-induced hyperglycaemic rats (but not in normal and streptozotocin-induced diabetic rats).

A volatile fraction of the Neem oil is reported to be responsible for spermicidal activity at a dose of 25 mg/ml for human sperm. The oil has been found to retard the growth of human immunodeficiency virus.

Neem oil has caused mitochondrial injury in mice; poisonous in high doses. (Sharon M. Herr.)

Dosage ► Dried leaf—1–3 g powder; 10–20 g for decoction; stembark—2–4 g powder decoction for external use. (*API* Vol. II.) Leaf juice—10–20 ml; oil—5–10 drops; bark decoction—50–100 ml. (*CCRAS*.)

Azima tetracantha Lam.

Family ► *Salvadoraceae*.

Habitat ► Peninsular India, Orissa, West Bengal.

English ► Mistletoe Berrythorn.

Siddha/Tamil ► Mulchangan.

Folk ► Kundali.

Action ► Root—diuretic (used in Siddha medicine for dropsy and rheumatism). Leaves—stimulant (used in rheumatism); expectorant, antispasmodic (used in cough and asthma); given to women after confinement. Bark—antiperiodic, astringent, expectorant.

The leaves contain the alkaloids azimine, azcarpine and carpine. EtOH (50%) extract of aerial parts exhibited spasmogenic activity.

B

Bacopa monnieri (Linn.) Penn.

Synonym ► *Herpestis monnieria* (Linn.) H. B. & K. *Moniera cuneifolia* Michx.

Family ► *Scrophulariaceae.*

Habitat ► Throughout the plains of India in damp marshy areas.

English ► Thyme-leaved Gratiola.

Ayurvedic ► Braahmi, Aindri, Nirbraahmi, Kapotavankaa, Bhaarati, Darduradalaa, Matsyaakshaka, Shaaluraparni, Mandukaparni (also equated with *Centella asiatica* Linn., synonym *Hydrocotyle asiatica* Linn. *Umbelliferae, Apiaceae*).

Unani ► Brahmi.

Siddha/Tamil ► Piramivazhukkai, Neerbrami.

Folk ► Jalaneem, Safed-Chammi.

Action ► Adaptogenic, astringent, diuretic, sedative, potent nervine tonic, anti-anxiety agent (improves mental functions, used in insanity, epilepsy), antispasmodic (used in bronchitis, asthma and diarrhoea).

Key application ► In psychic disorders and as a brain tonic. (*The Ayurvedic Pharmacopoeia of India; Indian Herbal Pharmacopoeia.*)

B. monnieri has been shown to cause prolonged elevated level of cerebral glutamic acid and a transient increase in GABA level. It is assumed that endogenous increase in brain glutamine may be helpful in the process of learning.

The herb contains the alkaloids brahmine, herpestine, and a mixture of three bases. Brahmine is highly toxic; in therapeutic doses it resembles strychnine. The herb also contains the saponins, monnierin, hersaponin, bacosides A and B. Bacosides A and B possess haemolytic activity. Hersaponin is reported to possess cardiotonic and sedative properties. It was found, as in case of reserpene, to deplete nor-adrenaline and 5-HT content of the rat brain.

An alcoholic extract of the plant in a dose of 50 mg/kg produced tranquilizing effect on albino rats and dogs, but the action was weaker than that produced by chlorpromazine.

Dosage ► Whole plant—1–3 g powder. (*API* Vol. II.)

Balanites aegyptiaca (Linn.) Delile,

Synonym ► *B. roxburghii* Planch.

Family ► *Simaroubaceae; Balanitaceae.*

Habitat ► Drier parts of India, particularly in Rajasthan, Gujarat, Madhya Pradesh and Deccan.

English ► Desert Date.

B

Ayurvedic ► Ingudi, Angaar Vrksha, Taapasadrum, Taapasa vrksha, Dirghkantaka.

Unani ► Hingan, Hanguul.

Siddha/Tamil ► Nanjunda.

Folk ► Hingol, Hingota, Hingothaa.

Action ► Seed—expectorant, bechic. Oil—antibacterial, antifungal. Fruit—used in whooping cough; also in leucoderma and other skin diseases. Bark—spasmolytic.

The plant is reported to be a potential source of diosgenin (used in oral contraceptives). The fruit pulp contains steroidal saponins. The diosgenin content of the fruit varies from 0.3 to 3.8%. Aqueous extract of fruits showed spermicidal activity without local vaginal irritation in human up to 4%; sperms became sluggish on contact with the plant extract and then became immobile within 30 s; the effect was concentration-related.

Protracted administration of the fruit pulp extract produced hyperglycaemia-induced testicular dysfunction in dogs. An aqueous extract of mesocarp exhibited antidiabetic activity in streptozotocin-induced diabetes in mice.

The seed contains balanitins, which exhibit cytostatic activity.

Dosage ► Leaf, seed, bark, fruit—50–100 ml decoction. (*CCRAS.*)

Balanophora involucrata Hook. f.

Family ► *Balanophoraceae.*

Habitat ► The Himalayas from Kashmir to Sikkim and Darjeeling at altitudes of 1,800–3,400 m

Ayurvedic ► Chavya (tentative synonym).

Action ► Astringent. Used in piles, also in rheumatism.

A related species, *B. polyandra* Griff., found in Nagaland, Manipur, West Bengal, Bihar, Orissa and Andhra Pradesh at 2,000 m, gave a phenolic glycoside, coniferin. The plant is used as an antiasthmatic.

Baliospermum montanum (Willd.) Muell.-Arg.

Synonym ► *B. axillare* Bl.
B. polyandrum Wt.
Croton polyandrus Roxb.

Family ► *Euphorbiaceae.*

Habitat ► The Himalayas, Assam, Khasi Hills, Bengal, Madhya Pradesh, Bihar and Peninsular India, ascending to 1,800 m.

Ayurvedic ► Danti, Nikumbha, Udumbarparni, Erandphalaa, Shighraa, Pratyak-shreni, Vishaalya. *Baliospermum calycinum* Muell-Arg. is considered as Naagadanti.

Siddha/Tamil ► Neeradimuthu, Danti.

Folk ► Jangli Jamaalgotaa.

Action ► Seed—purgative. Leaves—purgative (also used in dropsy), antiasthmatic (decoction is given in asthma). Latex—used for body ache and pain of joints. Root and seed oil—cathartic, antidropsical.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of dried root in jaundice, abdominal lump and splenomegaly.

The presence of steroids, terpenoids and flavonoids is reported in the leaves. The root contains phorbol derivatives. EtOH extract of roots showed *in vivo* activity in P-388 lymphocytic leukaemia.

Dosage ▶ Root—103 g powder. (*API* Vol. III.)

Balsamodendron mukul Hook. ex Stocks

Synonym ▶ *Commiphora mukul* (Hook. ex Stocks) Engl.
C. wightii (Arn.) Bhandari.

Family ▶ *Burseraceae.*

Habitat ▶ Rajasthan, Madhya Pradesh, Assam, Andhra Pradesh, Karnataka.

English ▶ Indian Bdellium, Gum Guggul.

Ayurvedic ▶ Guggul, Devadhoop, Kaushika, Pur, Mahishaaksha, Palankash, Kumbha, Uluukhala.

Unani ▶ Muqallal yahood, Muql, Bu-e-Jahudaan

Siddha/Tamil ▶ Erumaikan Kungiliyam.

Action ▶ Oleo-gum-resin—used for reducing obesity and in rheumatoid arthritis, osteoarthritis, sciatica.

Key application ▶ In the treatment of hyperlipidemia, hypercholesterolaemia and obesity. (*WHO.*)

Guggulipid is hypocholesteremic. Guggul resin contains steroids—gugglsterones Z and E, guggulsterols I–V, diterpenoids; volatile oil, including other constituents, contains a terpene hydrocarbon cembrene A. E- and Z-guggulsterones are characteristic constituents, which distinguish *C. mukul* from other *Commiphore* sp.

Guggul resin increases catecholamine biosynthesis and activity in cholesterol-fed rabbits, inhibits platelet aggregation, exhibits anti-inflammatory activity and appears to activate the thyroid gland in rats and chicken. Z-guggulsterone may increase uptake of iodine by thyroid gland and increase oxygen uptake in liver and bicep tissues. (*Planta Med* 1984, 1, 78–80.)

The gum is also used in hemiplegia and atherosclerotic disorders; as a gargle in pyrrhoea aveolaris, chronic tonsilitis and pharyngitis. Fumes are recommended in hay fever, chronic bronchitis and nasal catarrh.

Oleo-gum resin of *Balsamodendron caudatum* is also equated with Guggul in Siddha medicine.

Dosage ▶ Oleo-gum-resin—2–4 g (*API* Vol. I.) 500 mg to 1 g (*CCRAS.*)

Balsamodendron myrrha Nees.

Synonym ▶ *Commiphora molmol* Engl.
C. abyssinica (Berg.) Engl.

Family ▶ *Burseraceae.*

Habitat ▶ Arabia, Somaliland.

Ayurvedic ▶ Bola, Hiraabola, Surasa, Barbara, Gandharasa.

B

Unani ► Murmakki, Bol.

Siddha/Tamil ► Vellaibolam.

Action ► Oleo-gum-resin—emmenagogue (used for irregular menstruation and painful periods), anti-inflammatory (on pharyngitis and gingivitis), antiseptic, bacteriostatic, antiviral, astringent, stimulant, expectorant, stomachic, carminative (in dyspepsia), a leucocytogenic agent (increases number of white cells in the blood). Used externally for treating acne, boils and pressure sores, internally as a blood purifier.

Key application ► In topical treatment of mild inflammations of the oral and pharyngeal mucosa. (*German Commission E.*) As a gargle or mouth rinse for the treatment of aphthous ulcers, tonsillitis, common cold and gingivitis. (*The British Herbal Pharmacopoeia, ESCOP.*)

The gum (30–60%) contains acidic polysaccharides, volatile oil (2–10%) including other constituents, heerabolene, eugenol, furanosequiterpenes and monoterpenes.

Myrrh is taken as a powder or a tincture, rather than as an infusion; used generally externally or as a gargle.

Aqueous suspension of the gum resin decreased ethanol-induced and indomethacin-induced ulcer in rats. (*J Ethnopharmacol,* 1997, Jan 55(2), 141–150.)

Dosage ► Gum-resin—3–5 g (*CCRAS.*)

Balsamodendron opobalsamum Kunth.

Synonym ► *Commiphora opobalsamum* (L.) Engl.

Family ► *Burseraceae.*

Habitat ► Found in countries on both sides of Red Sea.

English ► Balsam tree, Balsam of Mecca, Balsam of Gilead.

Unani ► Balsaan, Roghan-e-Balsaan (oil), Hab-e-Balsaan (fruit). Ood-e-Balsaan (wood).

Action ► Used in diseases of the urinary tract. Balsams are diuretic and stimulate mucous tissues in small doses (nauseatic and purgative in large doses).

In Unani medicine, the fruit is used as an expectorant and emmenagogue, also for neurological affections. The wood is also used as an ingredient in compounds for epilepsy and other nervine disorders. The oil is used externally for its anti-inflammatory and revitalizing properties.

Bambusa bambos (L.) Voss.

Synonym ► *B. arundinaceae* (Retz.) Roxb.
Arundo bambos L.

Family ► *Gramineae; Poaceae.*

Habitat ► Wild throughout India, especially in the hill forests of Western and Southern India.

English ► Spiny or Thorny Bamboo.

Ayurvedic ▶ Vansha, Venu, Kichaka, Trinadhwaj, Shatparvaa, Yavphala. Vanshalochana, Vansharochanaa, Shubhaa, tugaa, Tugaakshiri, Tvakkshiri (Bamboo-manna). Starch of *Curcuma angustifolia* Roxb., *Zingiberaceae,* was recommended a substitute for Vanshalochana (*Ayurvedic Formularly of India,* Part I, First edn).

Unani ▶ Qasab, Tabaashir (Bamboo-manna).

Siddha/Tamil ▶ Moongil; Moongiluppu, (Bambo-manna.)

Action ▶ Leaf bud and young shoots—used in dysmenorrhoea; externally in ulcerations. Leaf—emmenagogue, antileprotic, febrifuge, bechic; used in haemoptysis. Stem and leaf—blood purifier (used in leucoderma and inflammatory conditions). Root—poisonous. Burnt root is applied to ringworm, bleeding gums, painful joints. Bark—used for eruptions. Leaf and Bamboo-manna—emmenagogue. Bamboo-manna—pectoral, expectorant, carminative, cooling, aphrodisiac, tonic (used in debilitating diseases, urinary infections, chest diseases, cough, asthma).

The plant gave cyanogenic glucoside—taxiphyllin. Bamboo-manna contains silicious crystalline substances.

The starch obtained from *Maranta arundinacea* Linn., *Marantaceae,* is also used as Bamboo-manna (known as Koovai Kizhangu, Kookaineer and Araroottu Kizangu in Siddha medicine).

Dosage ▶ Manna—1–3 g (*CCRAS.*)

Barbarea vulgaris R. Br.

Family ▶ *Brassicaceae, Cruciferae.*

Habitat ▶ Subalpine and temperate Himalayas, at altitudes of 1,800–3,750 m.

English ▶ Bitter Cress, Hedge Mustard, Yellow Rocket, Winter Cress.

Folk ▶ Cress.

Action ▶ Diuretic, anthelmintic, stomachic, antiscorbutic, (leaves are rich in vitamin C 130 mg/100 g). Pulverised herb is used as an agent for stimulating spermatogenesis.

The roots contain sinigrin; seeds contain a glucoside, glucobarbarin, and myrosin.

The protein and phosphorus contents of the plant decrease with the maturity, whereas the calcium contents increase (tender stems are eaten as a salad). The leaves and buds are a rich source of provitamin A (betacarotene).

Barleria buxifolia Linn.

Family ▶ *Acanthaceae.*

Habitat ▶ Peninsular India from Maharashtra southwards up to an altitude of 1,200 m. An ornamental hedge plant in gardens.

Ayurvedic ▶ Sahachara (purple, blue, rose or white-flowered var.)

Folk ▶ Jhinti.

B

Action ► Roots and leaves are used in cough, bronchitis, inflammations (applied to swellings).

Barleria cristata Linn.

Family ► *Acanthaceae.*

Habitat ► Subtropical Himalaya, Sikkim, Khasi Hills, Central and Southern India at 1,350 m.

Ayurvedic ► Sahachara, Shveta-Rakta-pushpa Saireyaka (white- and red-flowered var.).

Siddha/Tamil ► Ottamulli.

Folk ► Katsaraiyaa. Raktajhinti.

Action ► Extract of the plant—sasmogenic and hypoglycaemic. Root extract—given in anaemia. The leaves are chewed in toothache. Roots and leaves are applied to swellings. An infusion is given in cough.

The roots contain anthraquinones; flowers gave apigenin, naringenin, quercetin and malvindin.

Barleria prionitis Linn.

Family ► *Acanthaceae.*

Habitat ► Throughout the hotter parts of India. Also, commonly grown as a hedge plant in gardens.

English ► Common Yellow Nail Dye Plant.

Ayurvedic ► Sahachara, Baana, Kurantaka, Kuranta, Koranda, Korandaka, Shairiya, Pita-saireyaka (yellow-flowered var.). Also equated with Vajradanti.

Unani ► Piyaabaansaa.

Siddha/Tamil ► Chemmulli.

Folk ► Piyaabaasaa, Jhinti, Katsaraiyaa.

Action ► Leaf—juice given in stomach disorders, urinary affections; mixed with honey and given to children with fever and catarrh; leaf juice is applied to lacerated soles of feet in the rainy season, mixed with coconut oil for pimples. Leaves and flowering tops—diuretic. Bark—diaphoretic and expectorant. Roots—paste is applied over boils and glandular swellings. Plant (Vajradanti)—antidontalgic, used for bleeding gums in Indian medicine. Ash, obtained from the whole plant, mixed with honey, is given in bronchial asthma.

The Ayurvedic Pharmacopoeia of India recommends oil extract of the plant for arresting greying of hair.

The leaves and flowering tops are diuretic, rich in potassium salts. Leaves and stems showed presence of iridoid glucosides, barlerin and acetylbarlerin. Flowers gave the flavonoid glycoside, scutellarein-7-neohesperidoside. The presence of beta-sitosterol is reported in the plant.

In the south, Nila Sahachara is equated with *Ecbolium linneanun* Kurz. (known as Nilaambari), and Shveta Sahachara with *Justica betonica* Linn.

Ecbolium linneanun plant is used for gout and dysuria; the root is prescribed for jaundice.

Dosage ► Whole plant—50–100 g for decoction. (*API* Vol. III.)

Barleria strigosa Willd.

Family ► *Acanthaceae.*

Habitat ► The Himalayas from Uttar Pradesh to West Bengal, up to an altitude of 1,200 m.

Ayurvedic ► Sahachara (blue-flowered var.).

Siddha/Tamil ► Nili.

Folk ► Koilekhaa.

Action ► Mild antiseptic, expectorant (given in spasmodic cough); also used as an antianaemic.

The plant gave beta-and gamma-sitosterol.

Barringtonia acutangula (Linn.) Gaertn.

Synonym ► *Eugenia acutangula* L.

Family ► *Lecythidaceae; Barringtoniaceae.*

Habitat ► Sub-Himalayan tracts from the Ganges eastwards to Assam and Madhya Pradesh.

English ► Indian Oak. (Oak is equated with *Quercus robur* L.)

Ayurvedic ► Nichula, Hijjala, Ijjala, Vidula, Ambuj. (*Central Council for Research in Ayurveda & Siddha* has wrongly equated Hijjala, Nichula and Vidula with Argyreia nervosa, Elephant Creeper.)

Unani ► Samandarphal. (Samandarphal is also equated with *Rhus parviflora* Roxb. in *National Formulary of Unani Medicine.*)

Siddha/Tamil ► Kadappai, Samudraphullarni.

Action ► Leaf juice—given in diarrhoea. Fruit—bitter, acrid, anthelmintic, haemolytic, vulnerary; prescribed in gingivitis as an expectorant. Powdered seeds—emetic and expectorant. Bark—astringent, used in diarrhoea and blennorrhoea. Febrifuge. Wood—haemostatic (in metrorrhagia).

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the fruit in goitre; also in psychological disorders.

The bark contains tannins (16%), also ellagic acid.

The fruits contain triterpenoid sapogenins. Saponins possess haemolytic properties.

A related sp. *B. racemosa* (L.) Roxb., found in Assam, eastern and western coasts of India and the Andaman Islands, is also equated with Samudraphala and Hijjala.

European Oak (*Quercus robur*) contains 15–20% tannins, consisting of phlobatannin, ellagitannins and gallic acid. The bark is used as astringent, antiseptic and haemostatic.

Dosage ► Fruit—1–3 g (*API* Vol. III.)

Basella alba Linn. var. **rubra** Stewart.

Synonym ► *B. rubra* Linn.

Family ► *Basellaceae.*

B

Habitat ► Grown as a pot herb in almost every part of India, except hills.

English ► Indian Spinach.

Ayurvedic ► Upodikaa, Potaki, Maalvaa, Amritvallari.

Siddha/Tamil ► Vaslakkirai.

Folk ► Poi.

Action ► Demulcent, diuretic, laxative (a good substitute for spinach and purslane). Used as a cooling medicine in digestive disorders. Leaf juice is used in balanitis and catarrhal affections. Externally applied in urticaria, burns, scalds. Root—decoction is given to stop bilious vomiting and in intestinal complaints. Used as poultice to reduce local swellings; sap is used in acne.

Used for checking malnutrition in children.

The essential amino acids are arginine, leucine, isoleucine, lysine, threonine and tryptophan. The plant contains several vitamins and minerals, is rich in calcium and iron compounds and contains a low percentage of soluble oxalates. The leaves also contain carotenoids, organic acids and water-soluble polysaccharides, bioflavonoids and vitamin K.

Dosage ► Whole plant—10–20 ml juice. (*CCRAS.*)

Bassia longifolia Koen.

Synonym ► *Madhuca longifolia* (Linn.) Macbride.

Family ► *Sapotaceae.*

Habitat ► South India; common in the monsoon forests of Western Ghats.

English ► Mowra Butter tree, South Indian Mahua.

Siddha/Tamil ► Illupei, Elupa, Naatu, Iluppei, Iruppei.

Action ► Flowers—laxative, bechic (used in coughs, colds and bronchitis), stimulant and nervine tonic. Seed oil—galactogenic, anticephalalgic, laxative in cases of habitual constipation and piles; used externally in rheumatism and skin affections. Bark, seed oil and gum—antirheumatic.

The herb contains 17% tannins and is used for bleeding and spongy gums, tonsillitis, ulcers, rheumatism and diabetes mellitus. Roots are applied to ulcers.

Seed kernel gave protobassic acid (a sapogenol) and two major saponins—Mi-saponins A and B. Mi-saponins (bisdesmosides of protobassic acid) exhibit anti-inflammatory activity in rheumatism.

The carollas are a rich source of sugars and contain an appreciable amount of vitamins and calcium (total sugars 72.9%, calcium 140 mg/100 g). Sugars are identified as sucrose, maltose, glucose, fructose, arabinose and rhamnose. Flowers are largely used in the preparation of distilled liquors. They constitute the most important raw material for fermentative production of alcohol.

Bauhinia acuminata Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Central India.

English ► Dwarf White Bauhinia.

Ayurvedic ► Kaanchnaara, Kovidaara (white-flowered var.)

Unani ► Kachnaal.

Siddha/Tamil ► Vellaimandarai.

Action ► Bark and leaves—a decoction is given in biliousness, stone in bladder, venereal diseases, leprosy and asthma. Root—boiled with oil is applied to burns.

Bauhinia malabarica Roxb.

Family ► *Caesalpiniaceae.*

Habitat ► South India, Assam and Bengal.

English ► Malabar Mountain Ebony.

Ayurvedic ► Ashmantaka var., Kaanchanaara var. (in the South).

Siddha/Tamil ► Malaiyatti.

Folk ► Aapataa (Maharashtra), Amli, Amlosaa.

Action ► Antidysenteric.

The plant contains flavonoid glycosides—quercitroside, iso-quercitroside, rutoside, taxifoline rhamnoside, kaempferol glycosides and quercetol glycoside.

Bauhinia purpurea Linn.

Family ► *Caesalpiniaceae*

Habitat ► The Himalayas, and distributed in Northern India, Assam, Khasi Hills. Also cultivated in gardens.

English ► Camel's Foot tree, Pink Bauhinia, Butterfly tree, Geramium tree, Orchid tree.

Ayurvedic ► Kovidaara, Rakta Kaanchanaara.

Unani/Siddha ► Sivappu mandaarai.

Siddha ► Mandarai.

Folk ► Koilaara, Khairwaal, Kaliaar, Rakta Kanchan.

Action ► Bark—astringent, antidiarrhoeal. Flower buds and flowers, fried in purified butter, are given to patients suffering from dysentery. Extract of stems are used internally and externally for fractured bones. Plant is used in goitre. It exhibited antithyroid-like activity in experimental animals.

The flowers contain astragalin, isoquercitrin and quercetin, also anthocyanins. Seeds contain chalcone glycosides.

Bauhinia racemosa Lamk

Family ► *Caesalpiniaceae.*

Habitat ► Sub-Himalayan tracts from Ravi eastwards, ascending to 1,000 m. in the Uttar Pradesh, West Bengal and Central and South India.

Ayurvedic ► Ashmantaka, Kanchini.

Unani ► Kachnaar.

Siddha/Tamil ► Kokku mandarai.

B

Folk ► Aapataa (Maharashtra), Kachnaala.

Action ► Bark—highly astringent, anti-inflammatory (used in glandular inflammations, skin diseases, ulcers), cholagogue. Leaves—anthelmintic; with onion for diarrhoea. Flowers—used in haemorrhages, piles; also in cough. Seed—antibacterial.

Octacosane, beta-amyrin and beta-sitosterol have been isolated from the bark. EtOH (50%) extract of seeds exhibited anticancer activity.

Bauhinia retusa Roxb.

Synonym ► *B. semla* Wunderlin.

Family ► *Caesalpiniaceae.*

Habitat ► Northwestern Himalayas up to 1500 m, also in Orissa, Madhya Pradesh and Andhra Pradesh.

Siddha ► Nirpa (Telugu).

Folk ► Semalaa, Kathmahuli. Gum—Thaur

Action ► Gum—emmenagogue, diuretic. (Gum resembles Gum arabic; used as an external application for sores). Protein isolated from seeds—hypoglycaemic, hypocholesterolaemic in young, normal as well as alloxan-induced diabetic albino rats.

The bark contains quercetin-3-O-beta-D-glucoside and rutin.

Bauhinia tomentosa Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Southern India, Assam and Bihar.

English ► Yellow Bauhinia, St. Thomas tree, Bell Bauhinia.

Ayurvedic ► Pita Kovidaara (yellow-flowered var.), Pita Kanchana.

Siddha/Tamil ► Kokkumandarai, Tiruvaatti, Kanjani.

Folk ► Kachnaar.

Action ► Antidysenteric. Fruit—diuretic. Bark—astringent. Root bark—vermifuge. A decoction of the root bark is prescribed for liver diseases. Seed—used for wound healing.

Seeds yield a fatty oil called ebony oil, a water soluble mucilage and saponins. Flowers gave isoquercitrin (6%), rutin (4.6%) and quercetin (small amounts).

Bauhinia variegata Linn.

Synonym ► *B. candida* Roxb.

Family ► *Caesalpiniaceae.*

Habitat ► Punjab, Western Peninsula and Assam. Also cultivated in gardens.

English ► Mountain Ebony, Buddhist Bauhinia.

Ayurvedic ► Kaanchanaara, Kaanchanaaraka, Kanchanak, Kaanchana, Gandhaari, Sonapushpaka, Ashmantaka.

Siddha/Tamil ► Sivappumanchori.

Action ► Buds—a decoction is given in piles (also used against tumours), haematuria, menorrhagia. Dried

buds are used in diarrhoea, dysentery, worm infestation, piles and tumours. Root—carminative, used in dyspepsia and flatulence (a decoction is reported to prevent obesity). Bark—astringent, anthelmintic; used externally in scrofula and skin diseases. Seeds—possess human blood agglutinating activity. Leaf—antifungal.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the stem bark in lymphadenitis and goitre. (*Kaanchnaar Guggulu* is prescribed for glandular swellings and goitre.)

Water-soluble portion of alcoholic extract of the plant showed preventive effect against goitre in rats.

Flowers gave flavonoids, kaempferol-3-galactoside and kaempferol-3-rhamnoglucoside. The stem bark yields hentriacontane, octacosanol and stigmasterol. Stem contains beta-sitosterol, lupeol and a flavanone glycoside.

Dosage ► Stem bark—20–30 g for decoction. (*API* Vol. I.)

Begonia laciniata Roxb. var. **nepalensis** A. DC.

Family ► *Begoniaceae.*

Habitat ► Tropical and sub-tropical regions, especially in America. Found in Sikkim, Arunachal Pradesh, Assam, Meghalaya, Nagaland and Manipur, ascending to an altitude to 2,100 m.

English ► Beefsteak Geraniums, Elephant's Ear.

Folk ► Hooirjo (West Bengal), Teisu (Nagaland).

Action ► A decoction of the root is given for liver diseases and fever. The extract from succulent stalks is used for venereal diseases in folk medicine. Fresh shoots are chewed for tooth troubles. Aqueous extracts of the leaves and flowers of *Begonia* sp. are active against Gram-positive and Gram-negative bacteria.

Hooirjo and Teisu are also equated with *B. palmata* D. Don var. *gamblei* Hara, found in northeastern regions of India.

Belamcanda chinensis (L.) DC.

Family ► *Iridaceae.*

Habitat ► Introduced from China; cultivated all over India, up to an altitude of 1,800 m.

Folk ► Surajkaanti (Assam), Dasbaha, Dasbichandi (Bengal).

Action ► Rhizomes—expectorant, deobstruent, resolvent, used in tonsillitis, chest and liver complaints (antiviral against pneumonia).

Presence of alkaloids is reported from the plant, glucoside, belamcandin from the roots. The leaves and flowers contain a glycoflavone. The seeds tested positive for leucoanthocyanins.

B

Benincasa hispida (Thunb.) Cogn.

Synonym ▶ *B. cerifera* Savi. *Cucurbita hispada* Thunb.

Family ▶ *Cucurbitaceae.*

Habitat ▶ Cultivated largely in Uttar Pradesh, Punjab, Rajasthan and Bihar.

English ▶ Ash Gourd, White Gourd, Wax Gourd, White Pumpkin.

Ayurvedic ▶ Kuushmaanda, Kuushmaandaka, Kuushmaandanaadi.

Unani ▶ Pethaa, Mahdabaa, Kaddu-e-Roomi.

Siddha/Tamil ▶ Ven-poosani, Saambalpushani.

Action ▶ Leaves—cooling, juice rubbed on bruises. Fruit decoction—laxative, diuretic, nutritious, styptic (given for internal haemorrhages and diseases of the respiratory tract.) Juice of fruit—used for treating epilepsy, insanity and other nervous diseases. The ash of fruit rind—applied on painful swellings. Seeds—anthelmintic.

The fruits contain lupeol, beta-sitosterol, their acetates and several amino acids. The fruit juice produces tranquilizing activity and mild CNS depressant effect in mice.

The roots of mature plant contain a pentacyclic triterpene, which exhibits antiallergic activity against both homologous passive cutaneous anaphylaxis and delayed hypersensitivity in mice. The fruit beverage contains pyrazine compounds.

Isomultiflorenol acetate, a pentacyclic triterpene, has been isolated as the major constituent of wax coating of fruits.

Dosage ▶ Dried pieces of the fruit—5–10 g (*API* Vol. IV.) Fruit juice—10–20 m (*CCRAS.*)

Berberis aristata DC.

Sub sp. ▶ *B. asiatica* Roxb. ex DC.

Substi. ▶ *B. lycium* Royle & other species.

Family ▶ *Berberidaceae.*

Habitat ▶ Northwestern Himalayas, Nilgiris, Kulu and Kumaon.

English ▶ Indian Barberry.

Ayurvedic ▶ Daaruharidraa, Daaru, Daarvi, Daarunishaa, Daarurajani, Vrahitaphala, Valliphala, Sthirphala. Pushpaphala, Somakaa, Parjanyaa, Parjani, Kantkateri, Taarthya, Pachampachaa. Kaaliyaka is now equated with Pita Chandana (*Coscinium fenestratum* (Gaertn.) Colebr., *Menispermaceae*). Extract—Rasaanjana.

Unani ▶ Daarhald. Rasaut (extract). Zarishk (fruit).

Siddha/Tamil ▶ Marmanjal.

Action ▶ Rasaut, Rasasranjana (extract)—bitter, cholagogue, antidiarrhoeal, stomachic, laxative, diaphoretic, antipyretic, antiseptic. Used externally in opthalmia,conjunctivitis, ulcers, sores, swollen gums. Root bark—anti-inflammatory, hypoglycaemic

hypotensive, antiamoebic, anticoagulant, antibacterial. Bark—used in liver complaints, diarrhoea, dysentery, cholera, gastric disorders, enlargement of spleen and for regulating metabolism. Berries—antiscorbutic, laxative.

Berberine hydrochloride and sulphate help in the diagnosis of latent malaria by releasing the parasites into the blood stream.

Alkaloid berberine possesses antibacterial and anti-inflammatory activities. It is used as an intestinal antiseptic and bitter stomachic. It also exhibits antineoplastic properties. (Its synthetic derivative dihydroberberine is used in brain tumour.)

Berberine has been found to inhibit the activity of enzymes trypsin (32%) and chymotrypsin (60%) *in in-vitro* studies.

B. asiatica Roxb.ex Dc. is found in the Himalaya at 900–3,000 m, Assam and Bihar.

See *B. vulgaris.*

Dosage ▶ Extract—1–3 g (*CCRAS.*); dried stem—5–10 ml decoction. (*API* Vol. II.)

Berberis chitria Lindl.

Synonym ▶ *B. aristata auct. Hook. f. & Thoms.*

Family ▶ *Berberidaceae.*

Habitat ▶ The Himalayas from Kashmir to Nepal, at altitudes of 1,500–2,400 m.

Ayurvedic ▶ Daaruharidraa (var.).

Folk ▶ Totaro, Kintodaa (Garhwal).

Action ▶ Same as that of *Berberis aristata.*

The root and stem bark contain alkaloids (5 and 4.2% respectively, calculated as berberine.)

The alcoholic extract of the roots was found to be better antimicrobial agent than the aqueous extract. The alkaloid palmitine hydroxide possesses antispermatogenic properties.

See *B. aristata* and *B. vulgaris.*

Berberis ulicina Hook, known as Khicharmaa in Tibet, is also equated with Daaruharidraa.

Berberis vulgaris Linn.

Family ▶ *Berberidaceae.*

Habitat ▶ Distributed in Northwestern Himalayas.

English ▶ Common Barberry, True Barberry.

Ayurvedic ▶ Daruharidraa (var.).

Folk ▶ Chatrod, Kashmal.

Action ▶ Root and bark—used for ailments of gastrointestinal tract, liver, gallbladder, kidney and urinary tract, respiratory tract, also as a febrifuge and blood purifier.

Key application ▶ Listed by *German Commission E* among unapproved herbs.

An extract with 80% berberine and additional alkaloids stimulated the bile secretion of rats by 72%. (*PDR.*) As cholagogue. (*The British Herbal Pharmacopoeia.*)

The main alkaloid is berberine (well tolerated up to 0.5 g). Berries are safe.

B

Bererine in small doses stimulates the respiratory system; poisonings have been observed from overdoses. Poisonings from the total herb have not been reported. (*German Commission E.*)

Berberine is bactericidal, amoebicidal and trypanocidal. Berberine is antidiarrhoeal, as it enters into the cytosol or binds to the cell membrane and inhibits the catalytic unit of andenylate cyclase. It is active *in vitro* and in animals against cholera.

Berberine stimulates bile secretion and shows sedative, hypotensive, anticonvulsant and uterine stimulant activity in animals. Alkaloid bermarine is also strongly antibacterial. It has been shown to increase white blood cell and platelet counts in animals with iatrogenic leukocytopaenia.

Berberine, berbamine and jatrorrhizine are hypotensive and sedative.

Many of the alkaloids are antineoplastic.

The alkaloid berbamine (50 mg three times daily for 1–4 weeks) helped reverse leukopaenia induced by benzene, cancer chemotherapy or radiotherapy in a clinical study. (Francis Brinker.)

Berberine, when combined with pyrimethamine, was more effective than combinations with other antibiotics in treating chloroquine-resistant malaria. (Sharon M. Herr.)

Bergenia ligulata (Wall.) Engl.

Synonym ► *B. ciliata* Sternb. *Saxifraga ligulata* Wall.

Family ► *Saxifragaceae.*

Habitat ► Temperate Himalaya from Kashmir to Bhutan, between altitudes of 900 and 3,000 m.

Ayurvedic ► Paashaanabheda, Ashmaribhedikaa, Ashmaribhit, Ashmghna, Shilaabhit, Shilaabheda. (These synonyms are also equated with *Aerva lanata* Juss.)

Siddha/Tamil ► Padanbethi.

Action ► Leaf and root—antiscorbutic, astringent, spasmolytic, antidiarrhoeal. Used in dysuria, spleen enlargement, pulmonary affections as a cough remedy, menorrhagia, urinary tract infections. Alcoholic extract of roots—antilithic. Acetone extract of rootbark—cardiotoxic, CNS depressant and anti-inflammatory; in mild doses diuretic but antidiuretic in higher doses. Anti-inflammatory activity decreases with increasing dosage.

Due to its depressant action on the central nervous system, the drug is used against vertigo, dizziness and headache in moderate or low dosage.

Key application ► In lithiasis, dysuria, polyuria. (*The Ayurvedic Pharmacopoeia of India; Indian Herbal Pharmacopoeia.*)

The rhizome contains an active principle bergenin (0.6%), gallic acid, glucose (5.6%), tannins (14.2–016.3%), mucilage and wax; a C-glycoside and beta-sitosterol.

Bergenin prevented stress-induced erosions in rats and lowered gastric outputs.

(Paashaanabheda indicates that the plant grows between rocks appearing to break them; it does not necessarily mean that it possesses lithotriptic property.)

Dosage ▶ Rhizome—20–30 g for decoction. (*API* Vol. I)

Beta vulgaris Linn. subsp. cicla (L.) Moq.

Synonym ▶ *B. vulgaris* auct. non L.

Family ▶ *Chenopodiacae.*

Habitat ▶ Native to Mediterranean region; cultivated in North India, Maharashtra and South India.

English ▶ Beet Root, Garden Beet, Chard.

Ayurvedic ▶ Palanki.

Folk ▶ Chukandar.

Action ▶ Leaf—used in burns and bruises, also for diseases of spleen and liver. Tuber and seed—expectorant. Leaf and seed—diuretic. Leaf, tuber and seed—anti-inflammatory. Seed oil—analgesic.

Beet roots are eaten raw as salad or cooked. The leaves are nutritionally superior to roots and are a good source of vitamins and minerals.

The plant contains alkaloids of which betaine is a mild diuretic and emmenagogue.

In research, using rats, chard increased regeneration of beta cells in pancreas. Maximum reduction of blood glucose was after 42 days of administration. (*J Ethnopharmacol,* 2000, 73: 251–259.)

Beets are used orally as a supportive therapy in the treatment of liver diseases and fatty liver (possibly due to betaine). Ingestion of large quantities might worsen kidney disease. (*Natural Medicines Comprehensive Database,* 2007.)

Betula alnoides Buch.-Ham. ex D. Don.

Synonym ▶ *B. acuminata* Wall.

Family ▶ *Betulaceae.*

Habitat ▶ The temperate and subtropical Himalayas, Khasi Hills and Manipur.

English ▶ Indian Birch, Naga Birch.

Ayurvedic ▶ Bhojapatra (var.).

Action ▶ Used in supportive therapy of rheumatic ailments.

Methyl salicylate (92.8%) has been reported from the essential oil of the bark (of the plant growing in north-eastern region of India).

Betula utilis D. Don.

Synonym ▶ *B. bhojpattra* Wall.

Family ▶ *Betulaceae.*

Habitat ▶ Temperate Himalaya from Kashmir to Bhutan.

English ▶ Himalayan Silver Birch, Indian Paper tree.

Ayurvedic ▶ Bhuurja, Bahulvalkala, Bahuputa, Lekhyapatraka, Charmi, Chitrapatra, Bhutahaa.

B

Folk ► Bhojapatra.

Siddha/Tamil ► Boorjapattram (leaves).

Action ► Resin—laxative. Leaves—diuretic; used in the form of infusion in gout, rheumatism, dropsy, and as a solvent of stones in the kidneys; used in skin affections, especially eczema. Bark—used in convulsions. Oil—astringent, antiseptic.

Key application ► (*B. pendula*) In irrigation therapy for bacterial and inflammatory diseases of the urinary tract and for kidney gravel; supportive therapy for rheumatic ailment. (*German Commission E, ESCOP.*)

European Silver Birch is equated with *Betula alba* L., synonym *B. pendula* Roth. Astringent, diuretic, anti-inflammatory, bitter, cholagogue; contains salicylates. Used for kidney and bladder complaints, sluggish kidney functions, rheumatism and gout. Methyl salicylate is obtained by distillation of the twigs. In an Indian sp., *B. acuminata,* methyl salicylate (92.8%) has been reported in the essential oil of the bark. *B. utilis* is also a close relative of *B. pendula.*

Dosage ► Bark—3–5 g powder; decoction—50–100 ml (*CCRAS.*)

Bidens pilosa Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout India in gardens, waste places and tea plantations.

Folk ► Phutium (Gujarat), Kuri (Garhwal).

Action ► Plant—cytotoxic. Leaf—applied to ulcers and swollen glands.

The plant contains a number of polyacetylenes which are toxic to bacteria, fungi and human fibroblast cells. Phenylheptatriyne is the major constituent of the leaves and stems.

B. pilosa Linn. var. *minor* (Blume) Sherff, synonym *B. pilosa* Linn. var. *bipinnata* Hook. f. in part, gave phytosterin-B, which like insulin, showed hypoglycaemic activity both in normal and diabetic rats. *B. pilosa* auct. non Linn., synonym *B. chinensis* Willd., is used for leprosy, fistulae, pustules, tumours.

Biophytum sensitivum (Linn.) DC.

Synonym ► *Oxalis sensitiva* Linn.

Family ► *Oxalidaceae.*

Habitat ► Throughout tropical India.

Ayurvedic ► Lajjaalu (var.) Vipareet Lajjaalu (non-classical), Alambushaa (Hindi commentators have equated it with Gorakh Mundi, *Sphaeranthus indicus* Linn., *Asteraceae.*)

Folk ► Lajoni, Jhalai, Lakajana.

Action ► Plant—used in insomnia, convulsions, cramps, chest-complaints, inflammations, tumours, chronic skin diseases. Ash—in stomachache. Leaves—diuretic, astringent, antiseptic. Paste is applied to burns, contusions

and wounds. Decoction is given in strangury, asthma and phthisis. Roots—decoction is given in lithiasis. Mature leaves are recommended in diabetes; contain an insulin-like principle.

A saline extract of leaves showed hypoglycaemic activity in rabbits.

Bixa orellana Linn.

Family ► *Bixaceae.*

Habitat ► Native to Central America, often cultivated in Madhya Pradesh and South India.

English ► Annatto.

Ayurvedic ► Sinduri, Sinduriyaa.

Siddha/Tamil ► Jabara, Manjitti.

Action ► Plant—astringent, antibilious, antiemetic, blood purifier. Leaves—infusion is given in jaundice, also in dysentery. Externally, scar-preventive. Root bark—febrifuge, antiperiodic. Seed pulp—haemostatic, antidysenteric, diuretic, laxative. Fruit—antidysenteric.

An antimicrobial constituent, maslinic acid, alongwith gallic acid and pyrogallol, has been isolated from the leaves. Alcoholic extract of the leaves completely inhibited *Micrococcus pyogenes,* but was inactive against *E. coli.* The aqueous extract, however, showed partial inhibition against *E. coli.* The aqueous extract also showed potent inhibitory activity towards lens aldose reductase, which plays an important role in the management of diabetic complications. The activity is attributed to a flavonoid, isoscutelarein.

Bixin, the main constituent of seed coat, shows cytostatic effect on the growth of human lymphoma cells. Bixin also has a hyperglycaemic effect and may disturb blood glucose control.

Blepharis edulis Pers.

Synonym ► *B. persica* (Burm.f.) Kuntze.

Family ► *Acanthaceae.*

Habitat ► Punjab and western Rajasthan.

English ► Acanthus.

Ayurvedic ► Utangana, Kaamavridhi, Chatushpatri, Ucchataa (equated with *Scirpus* or *Cyperus* sp. during the classical period; with Shveta Gunjaa, *Abrus* sp. during the medieval period.)

Unani ► Utangan.

Folk ► Karadu (Maharashtra).

Action ► Roots—diuretic. Used for urinary discharges and dysmenorrhoea. Seeds—deobstruent, resolvent, diuretic (used in strangury and sexual debility). Powdered plant is applied locally on infections of the genitals and on burns.

Key application ► Seed in dysuria and impotency. (*The Ayurvedic Pharmacopoeia of India.*)

A benzoxazine glucoside, blepharin, has been isolated from seeds, and a saponin, which on hydrolysis gave lupeol.

Dosage ► Dried seed—3–6 g powder. (*API* Vol. IV.)

B

Blepharis linariaefolia Pers.

Synonym ► *B. sindica* T. Anders.

Family ► *Acanthaceae.*

Habitat ► Punjab, Haryana, Rajasthan and Gujarat.

Ayurvedic ► Ushtrakaandi, Utangan (var.).

Folk ► Utangana (Sindh). Asad.

Action ► Seeds, boiled in milk, are taken as an invigorating tonic.

Blepharis molluginifolia Pers., used for urinary discharges, is also equated with Utangana.

Blepharispermum subsessile DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Madhya Pradesh, Maharashtra, Karnataka.

Ayurvedic ► Used as a substitute for Raasnaa in Madhya Pradesh.

Action ► Anti-inflammatory (used internally and externally for rheumatic affections).

Blumea balsamifera DC.

Synonym ► *B. densiflora* Hook. f. in part.

Family ► *Compositae; Asteraceae.*

Habitat ► Subtropical Himalayas, Nepal, Sikkim, Assam and Khasi Hills at 700–1,350 m.

English ► Ngai Camphor.

Ayurvedic ► Kukundara, Gangaapatri.

Unani ► Kakarondaa.

Action ► Tranquilizer (used in excitement and insomnia), expectorant, sudorific. Given in intestinal diseases, colic, diarrhoea. Essential oil from leaves—hypotensive.

The plant is a source of Ngai or Blumea Camphor. Camphor occurs in all parts of the plant, but is generally extracted from leaves. Ngai Camphor oil consists almost entirely of *l*-borneol. It is redistilled to obtain the refined camphor for use in medicine.

The dried leaves contain sesquiterpene lactones. These lactones exhibit antitumour activity against Yoshida sacoma cells in tissue culture.

The plant exhibits moderate antibacterial activity against *E. coli.*

Blumea densiflora DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Sub-tropical Himalayas, Nepal, Sikkim, Assam and Khasia hills.

English ► Ngai Camphor.

Ayurvedic ► Kukundara (var.).

Action ► Juice of fresh leaves—insecticidal, mosquito repellant. The plant yields an essential oil which yields camphor.

Aerial part contains sesquiterpene lactones, tagitinin A, tirolundin ethyl ether and iso-alantolactone derivatives.

B

Blumea eriantha DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala.

Ayurvedic ► Kukundara (var.).

Unani ► Kakarondaa.

Folk ► Nirmudi (Maharashtra).

Action ► Juice of the herb—carminative. A warm infusion of leaves is given as a sudorific, while a cold infusion is considered diuretic and emmenagogue. The oil possesses significant antibacterial and antifungal properties. The oil also shows insecticidal activity.

The essential oil contains 95% ketones, the chief constituent of which are *d*-carvotanacetone and *l*-tetrahydrocarvone and an alcohol.

The plant contains a flavonol, crianthin (isolated from the flowers). It is identical to artemetin, isolated from Artemisia absinthium.

Blumea fastulosa (Roxb.) Kurz.

Synonym ► *B. glomerata* DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Tropical Himalayas, and throughout the plains of Assam and Penninsular India.

Ayurvedic ► Kukundara (var.).

Unani ► Kakarondaa.

Action ► Plant—diuretic. Essential oil—CNS depressant.

The steam non-volatile fraction of plant extract contained a mixture of *n*-alkanes.

Blumea lacera.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout the plains of India, ascending to 700 m.

Ayurvedic ► Kukundara, Kukuradru, Taamrachuuda.

Unani ► Kakarondaa.

Siddha/Tamil ► Narakkarandai, Kaatu Mullangi.

Folk ► Kakranda.

Action ► Plant—antipyretic. Leaf—astringent, febrifuge, diuretic, deobstruent, anthelmintic (particularly in case of thread worm). Root—anticholerin. Essential oil—antibacterial, antifungal.

The leaves on steam distillation yield 0.5% essential oil from which camphor is isolated.

The oil contains cineol 66, *d*-fenchone 10 and citral about 6%. The plant gave a diester of coniferyl alcohol, acetylenic compounds, a thiophene derivative; aerial parts gave campesterol, hentriacontane, hentriacontanol, alpha-amyrin and its acetate, lupeol and its acetate and beta-sitosterol.

The alcoholic extract of the plant showed marked anti-inflammatory activity in carrageenin and bradykinin-induced inflammation in rats.

Dosage ► Root—5–10 g paste. (*CCRAS.*)

B

Boerhavia diffusa Linn.

Synonym ▶ *B. repens* Linn.
B. procumbens Roxb.

Family ▶ *Nyctaginaceae.*

Habitat ▶ Throughout India as a weed.

English ▶ Horse-purslane, Hogweed.

Ayurvedic ▶ Rakta-punarnavaa, Punarnavaa, Katthilla, Shophaghni, Shothaghni. Varshaabhu (also equated with *Trianthema portulacastrum* Linn., which exhibits anti-inflammatory, antipyretic and analgesic activity).

Unani ▶ Itsit, Bishkhaparaa.

Siddha/Tamil ▶ Mookkirattai.

Folk ▶ Gadaha-purnaa.

Action ▶ Diuretic, anti-inflammatory, antiarthritic, spasmolytic, antibacterial (used for inflammatory renal diseases, nephrotic syndrome, in cases of ascites resulting from early cirrhosis of liver and chronic peritonitis, dropsy associated with chronic Bright's diseases, for serum uric acid levels). Root—anticonvulsant, analgesic, expectorant, CNS depressant, laxative, diuretic, abortifacient.

Key application ▶ As diuretic, hepatoprotective. (*Indian Herbal Pharmacopoeia.*)

B. repanda, synonym *B. chinensis* Linn., roots exhibited antihepatotoxic activity against carbon tetrachloride galactosamine-and paracetamol-induced intoxication in rats. Powdered root gave encouraging results in spermatorrhoea and leucorrhoea.

The chloroform and methanolic extracts of the roots and aerial parts of *B. diffusa* also exhibited antihepatotoxic activity against carbon tetrachloride-induced intoxication in rats.

Punarnavaa is official in IP as a diuretic. The diuretic action of the drug is attributed to the presence of xanthone, beta-ecdysone. Flavonoid, arbinofuranoside, present in the drug, was found to lower serum uric acid in experimental animals, as also in humans.

Punarnavaa has been reported to increase serum protein level and reduce urinary protein extraction in clinical trials in patients suffering with nephrotic syndrome. The activity is attributed to the presence of rotenoids in various parts of the plant.

An antifibrinolytic agent, punarnavoside, has been found to stop IUCD-induced bleeding in monkeys. The drug contains quinolizidine alkaloids.

Dosage ▶ Whole plant—20–30 g for decoction (*API* Vol. I); root—1–3 g powder; 10–20 ml fresh juice. (*API* Vol. III.)

Boerhavia verticillata Poir.

Family ▶ *Nyctaginaceae.*

Habitat ▶ Throughout plains of India.

Ayurvedic ▶ Shveta Punarnavaa, Vrshchiva, Vrshchiraka. (Vrishchira is also equated with *Trianthema* sp.) *B. erecta,* synonym *B. punarnava* Saha and Krishnamurthy, is also equated with the white-flowered species of Boerhavia.

Action ▶ See *B. diffusa.*

Bombax ceiba Linn.

See Salmalia malabarica Schott & Endl.

Borago officinalis Linn.

Family ► *Boraginaceae.*

Habitat ► The Mediteranean region, Europe and Asia.

English ► Borage, Cow's Tongue Plant.

Unani ► Gaozabaan (*Onosma bracteatum* Wall. has also been equated with Gaozabaan).

Action ► Fresh herb (compounded with water)—refreshing, restorative and nervine tonic. Leaves and flowers—diuretic, febrifuge, expectorant, demulcent, emollient; promote the activity of kidneys; alleviate pulmonary affections.

The drug strengthens adrenal glands and is given for stress, mental exhausion and depression; provides support to stomach and intestines in cases of infection and toxicity. Used as a tonic to counteract the lingering effects of steroid therapy. Seeds relieve irritable bowel syndrome and regulate menstruation.

The leaves contain lycopsamine and supindine viridiflorate as the predominant unsaturated pyrrolizidine alkaloids. Due to low concentration of these alkaloids Borage is not toxic.

The drug contains potassium and calcium, combined with mineral acids. The fresh juice affords 30%, the dried herb 3% of nitrate of potash. The stems and leaves supply much saline mucilage. These saline qualities are mainly responsible for the wholesome invigorating properties of Borage.

Borage imparts pleasant flavour and cooling effect to beverages. In India, squashes and syrups, sold during summer, contain Borage extract.

Borage contains ascorbic acid (38 mg/100 g). Flowers contain cholin, glucose, fructose, amino acids, tannin (about 3%). Seeds contain protein (20.9%) and an oil (38.3%). The seed oil is one of the important sources of gamma-linoleic acid and linoleic acid. Borage oil, combined with Evening Primrose oil, is used in hypercholesterolaemia.

Borage seed oil is used for rheumatoid arthritis, atopic eczema, infantile seborrhoeic dermatitis, neurodermatitis, also for PMS and for preventing heart disease and stroke. Only UPA (unsaturated pyrrolizidine alkaloids) free oil is given internally.

Listed by *German Commission E* among unapproved herbs.

It has been suggested that borage not be used with drugs known to lower the seizure threshold such as tricyclic antidepressants and phenothiazines due to GLA content (only borage seed oil contains significant amounts of GLA). (Francis Brinker.)

Borassus flabellifer Linn.

Family ► *Palmae; Arecaceae.*

Habitat ► Coastal areas of Bengal, Bihar and Western and Eastern Peninsula.

English ► Palmyra Palm, Brab tree.

B

Ayurvedic ► Taala, Taada, Trinraj, Mahonnata, Lekhyapatra.

Siddha/Tamil ► Panai, Panaimaram.

Action ► Fresh sap—diuretic, cooling, antiphlegmatic, laxative, anti-inflammatory. Slightly fermented juice is given in diabetes. Palm-jaggery—used as an energy food for convalscents. Ash of dry spadix—antacid, antibilious (used in heartburn). Young root, terminal buds, leaf-stalks—used in gastritis and hiccups.

The sap is given as a tonic to asthmatic and anaemic patients. Jaggery is given for anaemia, for diseases characterized by a marked loss of potassium. Palm candy is used in coughs and pulmonary affections and as a laxative for children.

The Ayurvedic Pharmacopoeia of India recommends dried male inflorescence in dysuria.

Jaggery solution may be used in hypertension and oedema due to heart and liver diseases, also as a food for typhoid patients.

The sap is an excellent source of biologically available riboflavin.

Aqueous MeOH extract of young shoots contains heat-stable toxin; edible part of young shoot, neurotoxic to rats, but not hepatotoxic.

Dosage ► Dried male inflorescence—1–3 g (*API* Vol. III.)

Borreria articularis (Linn. f.) F. N. Williams.

Synonym ► *B. hispada* (L.) K. Sch. *Spermacoce hispida* Linn.

Family ► *Rubiaceae.*

Habitat ► Throughout India, as a weed in cultivated and sallow lands and pastures.

English ► Shaggy Button Weed.

Ayurvedic ► Madana-ghanti.

Siddha/Tamil ► Nathaichoori.

Folk ► Ghanti-chi-bhaaji (Maharashtra), Gatbhanjan, Satgathiyaa.

Action ► Herb—used in the treatment of headache. Root—prescribed as a mouthwash in toothache. Leaf—juice is given as an astringent in haemorrhoids. Seeds—used as demulcent in diarrhoea and dysentery.

The weed contains beta-sitosterol, ursolic acid and D-mannitol. It is rich in calcium and phosphorus. Isorhamnetin, a flavonoid, is reported in the seeds.

Boswellia serrata Roxb.

Family ► *Burseraceae.*

Habitat ► The drier parts of Peninsular India.

English ► Indian Frankincense, Indian Olibanum.

Ayurvedic ► Shallaki, Susravaa, Gajabhakshyaa, Salai. Gum—Kunduru.

Unani ► Kundur (gum).

Siddha/Tamil ► Parangisambirani, Kungli.

Folk ► Salai Guggul.

B

Action ► Gum-resin—antiseptic, anti-inflammatory, antiatherosclerotic, emmenagogue, analgesic, sedative, hypotensive. Also used in obesity, diarrhoea, dysentery, piles, urinary disorders, scrofulous affections. Oil—used topically in chronic ulcers, ringworm.

Nonphenolic fraction of gum-resin exhibited marked sedative and analgesic effect in rats. It produced a marked and long-lasting hypotension in anaesthetized dogs.

Many derivatives of 3-keto-methyl-beta-boswellic ester, isolated from the gum-resin., have been prepared; a pyrazoline derivative exhibited maximum anti-inflammatory activity. (Gum-resin is used in osteoarthritis, juvenile rheumatoid arthritis, soft tissue fibrositis and spondylitis, also for cough, bronchitis, asthma, mouth sores.)

Essential oil from gum-resin—antifungal.

Gum-resin contains triterpenes of oleanane, ursane and euphane series.

Stem and fruit—hypoglycaemic.

Dosage ► Gum-resin—1–3 g (*API* Vol. IV.)

Brassica alba (L.) Boiss.

Synonym ► *Sinapis alba* L.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Native of Europe and West Asia. Cultivated in North India as a crop.

English ► White Mustard.

Ayurvedic ► Siddhaartha, Shveta Sarshapa, Sarshapa-Gaura.

Unani ► Khardal Safed.

Siddha/Tamil ► Venkadugu.

Folk ► Safed Raai.

Action ► Stimulant to gastric mucosa, increases pancreatic secretions; emetic (used in narcotic poisoning), diaphoretic, rubefacient. (As a counter-irritant it increases flow of blood to a specific area.) Used externally as a poultice in bronchitis, pleurisy, intercostal neuralgia, chilbains.

Seeds contain glucosinolates.

Sinalbin in *B. alba* and sinigrin in *B. juneja* oil are toxic constituents. The oil with toxic constituents should be avoided in gastrointestinal ulcers and kidney disorders. When moistened, sinigrin in the seeds is degraded to allyl isothiocyanate, a potent irritant volatile oil. (Francis Brinker.)

Glucosinolates are goitrogenic. Excessive consumption of *Brassica* sp. vegetables may alter absorption of thyroid hormone in G2 tract. (Sharon M. Herr.)

Brassica campestris Linn. var. **rapa** (L.) Hartm.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Cultivated as an oil-yielding crop.

English ► Field Mustard, Turnip Rape.

Ayurvedic ► Sarshapa, Siddhaartha.

Unani ► Sarson.

B

Siddha/Tamil ► Kadugu.

Action ► Stimulant, diuretic, emetic, rubefacient, counter-irritant. Used externally for bronchitis and rheumatic pains (increases flow of blood to a specific area). Powdered seeds are used as a tea for colds, influenza and fever.

The seeds contain glycosinolates (the derivatives are responsible for toxicity). The concentration of the major glucosinolate, gluco-napin, varies from 0.64 to 1.8% in the oil-free meal of Indian brassicas. The glucosinolates in rapeseed meal split upon enzymatic hydrolysis to produce glucose, potassium, hydrogen sulphate and a sulphur-containing compound which undergoes intramolecular rearrangement to give rise to the antinutritional factors, isothiocyanates or thiocyanates.

The volatile oil of mustard is given internally in colic; in overdoses it is highly poisonous and produces gastro-enteric inflammations. It is employed externally as a liniment for rheumatic pains.

Adulteration of mustard oil with argemone oil (*Argemone mexicana* is frequently found growing in brassica fields), by accident or by design, has led to the widespread epidemics of dropsy and glaucoma due to an alkaloid sanguinarine.

Black mustard contains sinigrin, which on hydrolysis by enzyme myrosin, produces allyisothiocynate; the white mustard contains sinalbin, which produces *p*-hydroxybenzyl isothiocynate. Mucilage contains sinapine.

Dosage ► Seed—500 mg to 1 g paste. (*API* Vol. III.)

Brassica juncea (Linn.) Czern. & Coss.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Cultivated in Punjab, West Bengal, Uttar Pradesh and Gujarat.

English ► Chinese Mustard, Brown Mustard.

Ayurvedic ► Raajikaa, Aasuri Raai, Tikshnagandhaa.

Siddha/Tamil ► Kadugu.

Folk ► Raai

Action ► Raai is a substitute for Mustard. Antidysenteric, stomachic, diaphoretic, anthelmintic. Increases pancreatic secretions. A decoction of seeds is given in indigestion, cough. Used externally as a counter-irritant in several complaints of nervous systems.

Brassica napus Linn.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Cultivated in Punjab, Bengal and Bihar.

English ► Mustard, Indian Rape.

Ayurvedic ► Krishna-Sarshapa, Raajakshavaka, Kattaka, Katusneha, Tantubha, Siddhaartha, Siddhaarthaka, Siddhaartha-sita, Rakshogna. (White variety of Sarshapa is also equated with Siddhaartha. Asita and Rakta seed varieties are reddish; Gaur and Siddhaartha are whitish.)

Unani ► Kaali Sarson.

Action ► Emollient, diuretic, anticatarrhal.

The oil gave brassino steroid—brasinolide. Seeds gave a antithyroid compound, 5-vinyl-2-oxazolidinethone; thioglucosides and thioglucosinolates. The seed oil is said to dissolves gallstone.

Brassica nigra (Linn.) Koch.

Family ▶ *Cruciferae; Brassicaceae.*

Habitat ▶ Cultivated in Punjab, Uttar Pradesh and Tamil Nadu.

English ▶ Black Mustard.

Ayurvedic ▶ Banarasi Raai, Raajika (var.).

Unani ▶ Khardal Siyah.

Siddha/Tamil ▶ Kadugu.

Folk ▶ Raai.

Action ▶ Seeds are used for treating coryza with thin excoriating discharge with lacrimation, sneezing and hacking cough, nostril blockage and dry and hot feeling of pharyngitis.

The seeds contain glucosinolate sinigrin, which produces allyl isothiocyanate when mixed with warm water. Allyl isothiocynate acts as a counterirritant when diluted (1:50).

Brayera anthelmintica Kunth.

Synonym ▶ *Hagenia abyssinica* (Bruce) J. F. Gmelin.

Family ▶ Rosaceae.

Habitat ▶ Indigenous to north-east Africa. Imported into Mumbai.

English ▶ Cusso, Brayera.

Folk ▶ Kusso.

Action ▶ Anthelmintic. Administered in the form of an infusion for the expulsion of tapeworm (ineffective against hookworm, roundworm, whipworm). Irritant to mucous membrane; produces nausea, vomiting and colic in large doses.

Breynia retusa (Dennst.) Alston.

Synonym ▶ *B. patens* Benth.

Family ▶ *Euphorbiaceae.*

Habitat ▶ The tropical Himalayas and Deccan peninsula.

Ayurvedic ▶ Bahuprajaa, Kaamboji (doubtful synonym).

Folk ▶ Kaali Kamboi (Gujarat).

Action ▶ Used as a galactagogue (as a supporting drug in herbal compound formulations). Spasmogenic.

Bridelia montana Willd.

Family ▶ *Euphorbiaceae.*

Habitat ▶ The sub-Himalayan tract from Kashmir eastwards to Assam, and in Bihar, Orissa and Andhra Pradesh.

Ayurvedic ▶ Ekaviraa.

Siddha/Tamil ▶ Venge-maram.

Folk ▶ Gondni, Asaanaa (Maharashtra).

Action ▶ Bark and Root—astringent, anthelmintic. Used in the treatment of bone fracture.

B

The root contains 5.7% tannins.

The leaves contain beta-sitosterol, its beta-D-glucoside and a triterpenoid. Fructose, glucose and sucrose were identified as the components of the glycoside.

Bridelia retusa (Linn.) Spreng.

Family ► *Euphorbiaceae.*

Habitat ► Throughout India up to an altitude of 1,000 m, except in very dry regions.

Ayurvedic ► Mahaaviraa, Asana (Asana is equated with *Pterocarpus marsupium* Roxb., the Indian Kino tree.)

Siddha/Tamil ► Mulluvengai.

Folk ► Gondani, Gondui, Khaajaa.

Action ► Bark—astringent, used in the form of a liniment in rheumatism. Paste of the stem bark is applied to wounds.

The bark contains 16–40% tannin. Presence of a triterpene ketone in the bark is reported. The bark exhibited hypotensive properties in pharmacological trials. The extract of the bark significantly increased the mean survival time of mice infected intracerebrally with vaccinia virus. Ripe fruit pulp contains beta-sitosterol and gallic and ellagic acids.

Brucea sativa

National Formulary of Unani Medicine, Part I, equated Jirjeer with Brucea sativa Mill. or Nasturtium officinale R. Br.

Nasturtium officinale, found in Europe, is known as watercress. Indian cress is cultivated in gardens as a creeper. Brucea is a totally different species (*Simaroubaceae*). Taraamirra of Unani medicine should be equated with Eruca sativa and not with Brucea sativa.

Action ► Taraamiraa (Jirjeer)—used in Unani medicine as a spermatic tonic (powder of seeds is administered with a half-fried egg), also as a blood purifier, diuretic, emmenagogue and deobstruent. Leaf juice—used as a lotion for blotches, spots and blemishes.

Nasturtium officinale (*Brassicaceae*): Antiscorbutic and stimulant. A rich source of vitamins A and E, also of ascorbic acid. Seeds contain glucon-casturtin. Used for metabolic disorders, anaemia, strangury, kidney and bladder disorders and catarrh of the respiratory tract.

Eruca sativa Mill.: Cultivated in North India; known as Taraamiraa, Siddhaartha, Bhutaghna. Seeds are used like mustard. Seeds—antibacterial. Crude juice of the plant inhibited *E. coli, S. typhi* and *B. subtlis.* Seeds contain (4-Me-thio)-Bu-glucosinolate (glucoerucin) as K and tetra-Me-N salts. A composition is used in induration of liver.

Brugmansia suaveolens Bercht. & Presl.

Synonym ► *Datura suaveolens* Humb. & Bonpl. ex Willd.

Family ► *Solanaceae.*

Habitat ► Native to Mexico; grown in Indian gardens.

English ► Angel's Trumpet.

Action ► Leaf and flower—used to treat asthma; to induce hallucinations. Can cause severe toxicity.

All parts of the plant contain tropane alkaloids (concentration highest in the foliage and seeds), particularly atropine, hyoscyamine and hyoscine (scopolamine.)

Brunella vulgaris Linn.

Synonym ► *Prunella vulgaris* Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► The Himalayas from Kashmir to Bhutan at altitudes of 1,400–4,000 m, in Khasi Hills and hills of South India.

English ► Self-heal.

Unani ► Substitute for Ustukhudduus. (*Lavandula stoechas* Linn.)

Folk ► Dhaaru.

Action ► Wound healing, expectorant, antiseptic, astringent, haemostatic, antispasmodic. Leaf—used in piles; and as a cooling herb for fevers.

The herb contains vitamins A, B, C and K; flavonoids; rutin. Flower spikes are liver-restorative, hypotensive, antioxidant.

Lupeol, stigmasterol and beta-sitosterol are obtained from the unsaponifiable fraction from the leaves, the saponifiable fraction gave lauric, stearic, palmitic, myristic, oleic and linoleic acids.

Bryonopsis laciniosa (Linn.) Naud.

Synonym ► *Bryonia laciniosa* Linn. *Diplocyclos palmatus* Jeff.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India.

English ► Bryony.

Ayurvedic ► Lingini, Shivalingi, Chitraphalaa.

Siddha/Tamil ► Iyaveli, Iyaviraali.

Folk ► Lingadonda (Telugu).

Action ► Seeds—anti-inflammatory, spasmolytic. Used for vaginal dysfunctions, as a fertility promoting drug. Powdered seeds, also roots, are given to help conception in women. Plant is also used in venereal diseases.

Bryophyllum pinnatum (Lam.) Kurz.

Synonym ► *B. calycinum* Salisb. *Kalanchoe pinnata* Pers.

Family ► *Crassulaceae.*

Habitat ► Throughout the warm and moist parts of India, especially abundant in West Bengal.

Ayurvedic ► Parnabija, Airaavati. (Also known as Paashaanabheda.)

Unani ► Zakhm-e-Hayaat.

Action ► Leaf—disinfectant, antibacterial (used for boils, insect bites, swellings, burns, wounds).

B

Leaves, mixed with those of *Aegle marmelos,* are given in blood and amoebic dysentery. Leaves are also eaten to control diabetes.

Leaves yield glycosides of quercetin and kaempferol, and fumaric acid. Plant extracts—antifungal.

Dosage ▶ Leaf—10–30 ml juice. (*CCRAS.*)

Buchanania axillaris (Desr.) Ramam.

Synonym ▶ *B. angustifolia* Roxb.

Family ▶ *Anacardiaceae.*

Habitat ▶ Dry deciduous forests in peninsular India.

English ▶ Buchanan's Mango, Cuddapah Almond.

Ayurvedic ▶ Priyaal (var.).

Unani ▶ Habb-us-Simanaa.

Siddha/Tamil ▶ Mudaima, Saaraapparuppu.

Action ▶ Kernel of seeds are considered best among *Buchanania* sp. Uses similar to those of *B. lanzan.*

An ethanolic extract (50%) of the aerial part showed CNS-depressant activity in mice.

Buchanania lanzan Spreng.

Synonym ▶ *B. latifolia* Roxb.

Family ▶ *Anacardiaceae.*

Habitat ▶ Drier parts of India.

English ▶ Almondette tree, Cheronjee, Buchanan's Mango.

Ayurvedic ▶ Priyaala, Piyaala, Kharskandha, Bahulvalkala, Taapaseshtha, Sannakadru Dhanushpat, Chaar.

Unani/Tamil ▶ Saaraapparuppu.

Siddha ▶ Mudaima, Morala (Tamil).

Action ▶ Kernel—laxative, febrifuge. An ointment made out of the kernels is used to cure itch of the skin and to remove blemishes from the face. Oil from kernels—substitute for almond oil. Applied to glandular swellings of the neck. The oil is a promising source of palmitic and oleic acids.

Kernel lipids (65.6%), comprised mainly of neutral lipids (90.4%), consist mostly of triacylglycerol (82.2%), free fatty acids (7.8%) and small amount of diacylglycerols, monoacylglycerols and sterols.

The kernels are used in Indian medicine as a brain tonic. The leaves are valued as a cardiotonic.

The leaves contain 2.64% tannins (0.35% gallo-tannins). The presence of triterpenoids, saponins, flavonoids and reducing sugars are also reported. Powdered or crushed leaves are applied to wounds.

The bark contains 13.40% tannins. The presence of alkaloids, saponins and reducing sugars is also reported.

Gum (stem exudate) is antidiarrhoeal. Used internally in rheumatism.

Dosage ▶ Stem bark—5–10 g (*API* Vol. IV.)

Bupleurum flacutum Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► The Himalayas from Kashmir to Bhutan and the Khasi Hills, at 1,000–4,000 m.

English ► Hare's Ear.

Folk ► Shingu (Himachal Pradesh), Sipil (Punjab), Thaanyo (Garhwal).

Action ► Roots—anti-inflammatory, haemolytic, antipyretic. Used in inflammations, muscle stiffness, neurosis, pain and pyrexia. Roots resolve inflammations of costal margin and diaphragm.

Key application ► Extracts have been used for the treatment of chronic hepatitis, nephrotic syndrome and auto-immune diseases (*WHO.*).

Therapeutic properties are attributed to saikoside or saikosaponins (yield from roots 2.06–3.02%), a complex mixture of triterpenic saponins. Saponin content varies with age. Saikosaponins are analgesic, antipyretic as well as antitussive; anti-inflammatory on oral administration. In Japan and China, roots have been used traditionally in auto-immune diseases. Saikosaponins form an ingredient of anti-tumour pharmaceuticals. A water-soluble crude polysaccharide fraction, prepared from the root, was reported to prevent HCl/ethanol-induced ulcerogenesis in mice significantly. Saikosaponin-*d*, at a concentration of more than 5 μm, inactivated measles virus and herpes simplex virus at room temperature.

Several sterols, possessing metabolic activities and plasma cholesterol-lowering activity, have also been isolated from the root.

Butea monosperma (Lam.) Taub.

Synonym ► *B. frondosa* Koenig ex Roxb.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout India, up to 1,200 m except in very arid regions.

English ► Flame of the Forest, Butea Gum, Bengal Kino.

Ayurvedic ► Paalasha, Kimshuka, Raktapushpaka, Kshaarshreshtha, Brahmavriksha, Samidvar.

Unani ► Dhaak, Samagh Dhaak, Kamarkas.

Siddha/Tamil ► Palasam, Purasus.

Folk ► Tesu.

Action ► Bark—astringent, styptic (prescribed in bleeding piles, ulcers, haemorrhages, menstrual disorders), anthelmintic. Flowers—astringent, diuretic, emmenagogue (also given for leucorrhoea). A decoction of flowers is given in diarrhoea and haematuria, also to puerperal women. Seeds—clinical use of seeds as an anthelmintic drug is not considered safe in humans.

Leaves—antibacterial. Stem bark—antifungal.

An aqueous extract of flowers has shown hepatoprotective activity against CCl4-induced liver injury in albino rats.

B

Extracts of flowers have exhibited significant anti-oestrogenic activity in mice. The seed suspension, on oral administration to albino rats (175 and 350 mg/kg body weight), showed 38.46 and 68.75% cases, respectively, where pregnancy was not interrupted but foetus was malformed.

Alcoholic extract of the whole plant produced persistent vasodepression in cats.

The plant contains flavonoids and glucosides—butin, butrin, isobutrin and palastrin. Flowers contain butrin, coreopsin, monospermoside and their derivatives and sulphurein; also chalcones.

Dosage ► Stem bark—5–10 g powder (*API* Vol. II); flower—3–6 g powder; seed—3 g powder; gum—0.5–1.5 g (*API* Vol. IV.)

Butea superba Roxb.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Central and Southern India.

Ayurvedic ► Lataa-Palaash (orange or orange scarlet-flowered var.).

Action ► Seeds—sedative and anthelmintic; decoction emollient and used topically for piles. Seed oil—anthelmintic and hypotensive. Seeds exhibit haemagglutinating activity against human ABO red cells. Roots—hypotensive. Watery sap from stems is used for drinking purposes. Bark is used in tonics and elixirs.

White-flowered var. is equated with *Butea parviflora* Roxb.

Buxus wallichiana Baill.

Synonym ► *B. sempervirens* Linn.

Family ► *Buxaceae.*

Habitat ► The Western and Central Himalayas and Punjab.

English ► Himalayan Boxwood tree.

Folk ► Chikri, Shamshaad. Paapari (Garhwal).

Action ► Wood—diaphoretic. Bark—febrifuge. Leaves—purgative, diaphoretic; used in rheumatism. Poisonous. Not a safe drug for "purifying blood". Symptoms of poisoning are severe—abdominal pain, vomiting, convulsions and death.

The mixture of alkaloids is referred to as buxine. Buxenine-G is cytotoxic.

There is preliminary evidence that a specific Boxwood leaf extract (SVP 30) might delay disease progression in HIV-infected patients. The extract is available through internet sources or AIDS Buyers' Clubs. (*Natural Medicines Comprehensive Database,* 2007.)

C

Caccinia crassifolia O. Kuntze.

Synonym ► *C. glauca* Savi.

Family ► *Boraginaceae.*

Habitat ► Native to Baluchistan. Available in Indian market as Gaozabaan.

Unani ► Gaozabaan. (According to *National Formulary of Unani Medicine,* Borago officinalis Linn. and other species of *Boraginaceae* are used as Gaozabaan.)

Action ► Leaf—diuretic, anti-inflammatory, demulcent; used for strangury, asthma and cough.

The stems and leaves gave sapogenins—caccigenin, caccigenin lactone and 23-deoxycaccigenin; rutin and a saponin derived from caccigenin. The leaves also gave a glucoside, caccinin. Caccinin and its aglucone caccinetin (which is the dimethylallyl ester of caffeic acid) is diuretic; saponins exhibit anti-inflammatory activity.

Flowers contain pyrrolizidine alkaloid, the diester of retronecine. Benzoic acid has also been isolated from the flowers.

Cadaba fruticosa (L.) Druce.

Synonym ► *C. farinosa* Forsk. *C. indica* Lam.

Family ► *Capparidaceae.*

Habitat ► Common in Punjab, Rajasthan, Gujarat, Madhya Pradesh and Tamil Nadu.

Siddha/Tamil ► Kattagatti, Vilivi, Villi.

Folk ► Kodhab.

Action ► Root and leaves—deobstruent, emmenagogue; used for uterine obstructions.

The leaves and stem bark gave alkaloids, L-stachydrine and L-3-hydroxystachydrine. Presence of quercetin, isoorientin, hydroxybenzoic acid, syringic acid, vanillic acid and 2-hydroxy-4-methoxy benzoic acid has also been reported. The stembark contains an alkaloid cadabicine, and dry pods contain cadabalone.

Caesalpinia bonduc (L.) Roxb. Dandy & Exell.

Synonym ► *C. bonducella* Flem. *C. crista* Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Throughout the hotter parts of India. Common in West Bengal and South India. Often grown as hedge plant.

English ► Fever Nut, Bonduc Nut, Nikkar Nut.

Ayurvedic ► Puutikaranja, Lataakaranja, Kantaki Karanja, Karanjin, Kuberaakshi (seed).

Unani ► Karanjwaa.

Siddha/Tamil ► Kazharchikkaai.

C

Action ► Seed—antiperiodic, antirheumatic. Roasted and used as an antidiabetic preparation. Leaf, bark and seed—febrifuge. Leaf and bark—emmenagogue, anthelmintic. Root—diuretic, anticalculous.

The seeds contain an alkaloid caesalpinine; bitter principles such as bonducin; saponins; fixed oil.

The seed powder, dissolved in water, showed hypoglycaemic activity in alloxanized hyperglycaemic rabbits. Aqueous extract of the seeds produced similar effects in rats. The powder forms a household remedy for treatment of diabetes in Nicobar Islands. In Kangra, Himachal Pradesh, roots are used in intermittent fevers and diabetes.

In homoeopathy, the plant is considered an excellent remedy for chronic fever.

(Three plant species—*Pongamia pinnata* Pierre, *Holoptelea integrifolia* (Roxb.) Planch. and *Caesalpinia bonduc* (L.) Roxb. are being used as varieties of Karanja (because flowers impart colour to water). *P. pinnata* is a tree and is equated with Karanja, Naktamaala and Udakirya; *H. integrifolia,* also a tree, with Chirabilva, Putika (bad smell) and Prakiryaa; and *C. bonduc,* a shrub, with Kantaki Karanja or Lataa Karanja.)

Dosage ► Seed kernel—1–3 g powder. (*CCRAS.*)

Caesalpinia coriaria (Jacq.) Willd.

Family ► *Caesalpiniaceae.*

Habitat ► Grows abundantly in South India, also cultivated in North-western India and West Bengal.

English ► American Sumac, Divi-divi Plant.

Siddha/Tamil ► Kodivelam.

Folk ► Libi-dibi; Divi-divi.

Action ► Bark—febrifuge, antiperiodic. Pod—astringent (in piles). Fruit—semen coagulant.

All parts of the plant contain tannin, the maximum amount occurring in the pods (69.4%). The tannins from pods comprise pyrogallol type of hydrolysable tannins and consists of gallotannin and ellagitannin. Divi-divi closely resembles myrobalans both in nature and contents of tannins. Seeds contain little or no tannin.

The plant is used for treating freckles. Leaves contain ellagic and gallic acids, catechol and tannins.

Ethanolic extract of the leaves showed antifungal activity.

Caesalpinia digyny Rottl.

Family ► *Caesalpiniaceae.*

Habitat ► Bengal, Assam and Andamans up to 1,000 m.

English ► Teri Pods.

Ayurvedic ► Vaakeri.

Siddha/Tamil ► Nunigatcha.

C

Action ► Root—astringent and antipyretic, used in phthisis and scrofulous affections.

The roots gave a phenolic compound vakerin, identical with bergenin. The ethanol-water extract of roots inhibits the growth of *Mycobacterium tuberculosis.*

The pods contain 28% tannin (without seeds, more than 54%). The bark contains 28% tannin (without seeds, more than 54%). The tannin is pure gallo-tannin and gallic acid.

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Caesalpinia pulcherrima Sw.

Family ► *Caesalpiniaceae.*

Habitat ► Cultivated in gardens throughout India.

English ► Barbados Pride, Peacock Flower.

Ayurvedic ► Padangam, Ratnagandhi, Krishnachuudaa.

Siddha/Tamil ► Mayirkonrai, Nalal.

Folk ► Guleturaa, Sankeshwara.

Action ► Leaves—laxative, antipyretic. Used in Eastern India as a substitute for senna. Dried and powdered leaves are used in erysipelas. Flowers—anthelmintic. Also used for cough and catarrh. Root—a decoction is prescribed in intermittent fevers. Bark—emmenagogue, abortifacient.

The plant contains a flavonoid, myricitroside. The leaves, flowers and fruits contain tannins, gums, resin, benzoic acid. Presence of cyanidin-3,5-diglucoside is also reported from the flowers, hydrocyanic acid from the leaves. The root contains caesalpin type diterpenoids along with sitosterol.

The leaves have displayed anticancer activity in laboratory animals. A diterpenoid, isolated from the root, also showed anticancer activity.

In Pakistan, the leaf and flower extract exhibited activity against Gram-positive bacteria.

Caesalpinia sappan Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Native to India and Malaysia. Cultivated in Bengal and South India, also grown as a hedge plant.

English ► Sappan.

Ayurvedic ► Pattanga, Patanga, Pattraanga, Raktasaara, Ranjana, Pataranjaka, Suranga, Kuchandana.

Unani ► Bakam.

Siddha/Tamil ► Patangam, Anaikuntrumani.

Folk ► Patang.

Action ► Wood decoction—emmenagogue, antidiarrhoeal; used in skin diseases.

The heartwood gave an anti-inflammatory principle brazilin; amyrin glucoside, amino acids and carbohydrates. EtOH (50%) extract of stem exhibited semen coagulant activity.

Aqueous and chloroform extracts of the wood exhibited inhibitory action

on cyclic AMP phosphodiesterase. The methanolic extract of the sappan lignan showed sleep-time-elongation effect in mice. Significant anti-hypercholesterolaemic activity is attributed to benzilic compounds.

The oil exhibited antibacterial and antifungal activity.

Plant pigments find use in facials which are resistant to light, heat and water and are non-irritating.

Dosage ► Heartwood—5–10 g (*API* Vol. IV.)

Cajanus cajan (Linn.) Millsp.

Synonym ► *C. indicus* Spreng.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Cultivated as pulse crop, chiefly in Madhya Pradesh, Bihar, Andhra Pradesh, Maharashtra, Uttar Pradesh and Karnataka.

English ► Pigeon Pea, Red Gram.

Ayurvedic ► Aadhaki, Tuvari, Tuvara, Shanapushpikaa.

Unani ► Arhar.

Siddha/Tamil ► Thuvarai.

Action ► Green leaves are considered hypocholesterolaemic. Pulse shows cholesterol and phospholipid lowering effect (reported to cause flatulence). A paste of leaves with salt and water, is taken on an empty stomach for jaundice. Leaves are used in diseases of the mouth, and topically for treating measles and other eruptions.

The Ayurvedic Pharmacopoeia of India indicated the use of the seed in lipid disorders and obesity; externally for promoting breast development, and attributed blood purifying properties to the root.

Amino acid analysis of the seed extract showed that phenylalanine (26.3% of the total amino acids) is responsible for about 70% of the antisickling potency of the seed extract.

Seeds also contain riboflavin and pyridoxine. Root bark contains isoflavones, sterols, triterpenoids, flavones, anthraquinone derivatives. Plant also contains an isoflavone, cajanol.

The aqueous extract of leaves showed vasodilatory effect in experimental animals.

Unroasted nuts had hypoglycaemic effect in mice; roasted seeds, in contrast, had a hyperglycaemic effect. (Sharon M. Herr.)

Dosage ► Root—2–6 g powder. (*API* Vol. III.)

Calamus rotang Linn.

Synonym ► *C. roxburghii* Griff.

Family ► *Palmae; Arecaceae.*

Habitat ► Central and South India.

English ► Rotang, Rattan, Chair Bottom Cane.

Ayurvedic ► Vetra, Abhrapushpa.

Siddha/Tamil ► Pirambu.

Action ► Astringent, antidiarrhoeal, anti-inflammatory (used in chronic fevers, piles, abdominal tumours, strangury), antibilious, spasmolytic. Wood—vermifuge.

The plant is used in convulsions and cramps. The presence of a saponin in the stem, an alkaloid in the leaves and a flavonoid in the root is reported.

Calamus tenuis Roxb.

Synonym ► *C. amarus* Lour.

Family ► *Palmae; Arecaceae.*

Habitat ► The sub-Himalayan tract from Dehra Dun to Assam.

English ► Bareilly Cane.

Ayurvedic ► Vetra (var.) (Vetasa, *Salix caprea* Linn., is a different drug).

Action ► See *C. rotang.*

Calamus travancoricus Bedd. ex Hook. f.

Family ► *Palmae; Arecaceae.*

Habitat ► Deccan peninsula, from Malabar to Travancore.

English ► Cane.

Ayurvedic ► Vetra.

Siddha/Tamil ► Pirambu.

Action ► Tender leaves are used in dyspepsia, biliousness and as an anthelmintic. See *C. rotang.*

Calendula officinalis Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout India; wild in Punjab.

English ► Pot-Marigold, Marigold; Calendula.

Unani ► Zergul.

Siddha/Tamil ► Thulvkka Saamanthi.

Action ► Flowers—anti-inflammatory, antiseptic, stimulant, antispasmodic, emmenagogue, antihaemorrhagic, styptic. Used in gastric and duodenal ulcers and dysmenorrhoea; externally for cuts, bruises, burns, scalds. Plant—antiprotozoal. Flower—antimicrobial. Essential oil—antibacterial.

Key application ► In inflammation of the oral and pharyngeal mucosa, internally and externally. Externally, on poorly healing wounds, ulcuscruris. (*German Commission E, WHO, ESCOP.*) Anti-inflammatory, vulnerary. (*The British Herbal Pharmacopoeia.*)

The flowers contain triterpenes, sterols, flavonoids, carotenes, bitter glycosides, resins, volatile oil, mucilage (do not contain tannins). Polysaccharides from flowers exhibited immunostimulating and antitumour activity in several *in vitro* test systems.

An alcoholic extract has been shown to have antitrichomonal activity.

Wound healing and anti-inflammatory properties are attributed to Mn and carotene. An aqueous alcoholic extract of florets showed CNS inhibitory effect with marked sedative activity in experimental animals.

The extract of flower-heads exhibited estrogenic activity (reduces period pains and regulates menstrual bleeding).

Calephlone, the extract containing the total polyphenols of the inflores-

cence, has a marked cholagogic effect in rats and has been found helpful in the treatment of CCl4-induced hepatitis. A hypocholesterolaemic saponin has been extracted from the plant.

Callicarpa macrophylla Vahl.

Synonym ► *C. incana* Roxb.

Family ► *Verbenaceae.*

Habitat ► Sub-Himalayan tracts, from Hazara eastwards to Assam, up to 1,500 m.

English ► Perfumed Cherry.

Ayurvedic ► Priyangu, Priyangukaa, Priyaka, Gandhphali, Gandhpriyangu, Phalini, Vanitaa, Kaantaa, Kaantaahvaa, Shyamaa, Anganaapriya.

Unani ► Habb-ul-Mihlb (*Prunus mahaleb* Linn., Rosaceae).

Siddha/Tamil ► Gnazhal, Chokkala. (Fruits of *Aglaia roxburghiana* Miq. are used as Priyangu.)

Action ► Leaves—applied hot in rheumatic pains. Smoked to relieve headache. Seed—paste used in stomatitis. Wood—paste used in mouth and tongue sores. Seeds and roots—employed as stomachic. Bark—used in rheumatism and diseases of genitourinary tract. *The Ayurvedic Pharmacopoeia of India* indicated the use of the fruit in emesis and giddiness.

The seeds and leaves contain calliterpenone and its monoacetate; the former also contain fatty acids, beta-sitosterol and its beta-D-glucoside.

Dosage ► Dried inflorescences powder—1–3 g (*API* Vol. II); fruit powder—1–2 g. (*API* Vol. IV.)

Calophyllum apetalum Willd.

Synonym ► *C. wightianum* T. Anders.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► The evergreen forests of Western Ghats up to 330 m.

Siddha/Tamil ► Shirupinnai.

Action ► Resin—antiphlogistic, anodyne. Seed oil—antileprotic.

The leaves, stem, bark and root contain friedelin. Leaves also contain canophyllol and a triterpene lactone; stem, beta-amyrin; bark, apetalic acid. Heartwood contains a clathrate named wightianone palmitic acid. Wood contains mesoinositol.

Calophyllum inophyllum Linn.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Coastal regions, particularly Orissa, Karnataka, Maharashtra and the Andamans. Also cultivated as an ornamental tree.

English ► Indian Laurel, Alexandrian Laurel.

Ayurvedic ► Punnaaga, Tunga, Sultaan champaa, Naagchampaa, Raajchampaa.

Siddha/Tamil ► Punnai, Punnagam.

Action ► Oil of seeds—specific for scabies and other skin diseases, and for rheumatism. Used in the

treatment of genitourinary and venereal diseases. Bark—juice is taken as purgative; pounded with water is applied in orchitis, and for dressing ulcers. Root bark—antibacterial, used for indolent ulcers. Leaf—used in vertigo and migraine, also for chicken pox, skin inflammations, scabies, sunburn. Flowers and stamens—used as a substitute for Naagakesara (*Mesua ferrea* Linn.)

The root bark and heartwood contain xanthones. The xanthones exhibited anti-inflammatory activity in rats against carrageenan-induce oedema; also CNS depressant activity. Jacareubin and 6-deoxy derivatives exhibited antiulcer activity in rats.

Calophyllolide, a complex 5-Ph-coumarin isolated from nuts, showed antiarrhythmic (as effective as quinidine), bradycardiac coronary dilator, and anticoagulant, also anti-inflammatory and antiarthritic activity.

Dosage ► Leaf, flower, bark—3–5 g powder; 50–100 ml decoction. (*CCRAS.*)

Calotropis gigantea (Linn.) R.Br. ex.Ait.

Family ► *Asclepiadaceae.*

Habitat ► Throughout India.

English ► Madar (white-flowered), Giant Milk-weed.

Ayurvedic ► Alarka, Raajaarka, Shvetaarka, Vasuka, Mandaar, Bhaasvanmuula, Dinesh, Prabhaakara, Ravi, Bhaanu, Tapana.

Unani ► Madaar, Aak.

Siddha/Tamil ► Erukku.

Action ► Flowers—stomachic, bechic, antiasthmatic. Milky juice—purgative (gastrointestinal irritant). Roots—used in lupus, tuberculous leprosy, syphilitic ulceration. Leaves—juice poisonous. Used in external swellings. All parts—used against bronchitis and asthma.

The leaf extract showed antitussive activity due to the presence of alkaloids and glycosides. The root contains glycosides 0.60–1.42% on dry basis. The latex contains akudarin. Flowers contain beta-amyrin and stigmasterol.

Dosage ► Milky juice—500 mg; leaf, flower, root bark—3–5 g powder. (*CCRAS.*)

Calotropis procera (Ait.) R.Br.

Family ► *Asclepiadaceae.*

Habitat ► An evergreen shrub distributed in West and Central India.

English ► Swallow-Wart, Milk Weed, (purple-flowered), King's Crown.

Ayurvedic ► Alarka, Surya, Suuryaahvya, Vikirna, Vasuka, Tapana, Tuulaphala, Kshirparna, Arkaparna, Aasphota.

Unani ► Aakh, Madaar, Ashar.

Siddha/Tamil ► Vellerukku, Erukku.

Action ► The plant is used against bronchial asthma (especially flowers with black pepper). Leaves—used for treating chronic cases of

C

dyspepsia, flatulence, constipation and mucus in stool. Seed oil—geriatric and tonic. Leaves, flowers and root-bark oil—antimicrobial (maximum activity in leaves). *The Ayurvedic Pharmacopoeia of India* indicated the use of the root and leaf in asthma and dyspnoea; stem bark in diseases of the spleen.

Root bark contains benzoylline-olone and benzolisolineolone. Root, stem and leaves, also latex contain beta-amyrin. Flowers contain evanidin 3-rhamnoglucoside. The plant contains a cardenolide, proceragenin, an antibacterial principle.

The latex is given for treating epilepsy, also in painful, joints and swellings. The latex exhibited anti-inflammatory activity in carrageenan-and formalin-induced rat paw oedema model.

The herb can alter menstrual cycle and temporarily inhibit ovulation. Cardiac glycosides may be additive when combined with Digoxin. (Sharon M. Herr.)

Dosage ► Leaf—250–750 mg powder; root—1–3 g for decoction (*API* Vol. I); stem bark—0.5–1 g powder (*API* Vol. III). Milky juice—500 mg to 1 g (*CCRAS*.)

Caltha palustris Linn.

Family ► *Ranunculaceae.*

Habitat ► Western temperate Himalayas from 2,500 to 4,000 m.

English ► American cowslip, Marsh Marigold, Water Buttercup.

Folk ► Mamiri (Punjab).

Action ► Anti-inflammatory. Root—hypocholesterolaemic. Poisonous to human beings in mature stages.

The flowers contain flavonoids, 7-rhamnosides, 3-glucosides and 3-gluco-7-rhamnosides of kaempferol and quercetin. Roots gave triterpenoid glycosides, which decreased serum cholesterol and total protein and increased blood sugar equivalent to butadione in rats.

EtOH (50%) extract of the plant exhibits CNS depressant and hypotensive activity in rat.

Calycopteris floribunda Lam.

Family ► *Combretaceae.*

Habitat ► Madhya Pradesh, Peninsular India and Assam.

Ayurvedic ► Sushavi, Paaniyavalli.

Siddha/Tamil ► Minnargodi.

Action ► Leaf—antidysenteric; used externally for ulcers. Fruit—used in jaundice.

Leaves contain flavanol calycopterin; flowers calycopterin and quercetin.

Camellia sinensis (Linn.) O. Kuntze.

Family ► *Theaceae.*

Habitat ► Cultivated in Assam, Darjeeling, Travancore, the Nilgiris, Malabar, Bengal, Dehra Dun and Kumaon.

English ► Tea.

C

Unani ► Chaai, Shaahi, Shaayi.

Siddha/Tamil ► Thaeyilai.

Action ► Stimulant, diuretic, astringent. In China, used for diarrhoea and dysentery (causes gastrointestinal upsets and nervous irritability when consumed in excess). Green tea: anticancer effects have been observed in Chinese green tea, *Camellia thea*, extract; the extract of Japanese green tea showed antihepatotoxic effects.

Important constituents of leaf buds and very young leaves are: caffeine, with a much smaller amount of other xanthines (theophylline and theobromine); tannins (the main tannin in green tea is (−)-epigallocatechin); flavonoids, quercetin, kaempferol. The stimulant and diuretic are due to caffeine content, the astringency due to the tannins.

Drinking tea lowers thiamine and thiamine diphosphate losses in urine and blood serum respectively but increases niacin losses. Hot water extract of black tea facilitates Ca absorption in the body experimentally. Tea may decrease zinc bioavailability.

The tea, if added to the meal, significantly lower the availability of iron. Milk is as effective as ascorbic acid in countering the depressing effect of tea on iron availability (*in vitro*).

The green tea catechin inhibited carcinogenesis in small intestines when given during or after carcinogen treatment to experimental rats. (−)-epigallocatechin gallate and theaflavin digallate from green tea inhibited the infectivity of both influenza A and B virus (*in vitro*).

Green tea, when added to a lard-cholesterol diet, decreased the cholesterol and triglyceride levels in fowls. Tea polyphenols exhibit hypocholesterolaemic activity.

Tea polyphenols—(−)-epicatechin gallate, (−)-epigallocatechine galate, theaflavin monogallate A or B, and or theaflavin digallate—are used for treating hyperglycaemia.

Saponins from tea are used as antiulcer agents.

Concurrent use of tea and beta-adrenergic agonists may increase the risk of cardiac arrhythmias. Caffeine, a component of tea, may increase insulin resistance. (Sharon M. Herr.)

Canarium commune Linn.

Synonym ► *C. vulgare* Leench.

Family ► *Burseraceae.*

Habitat ► A tree indigenous to Malaysia. Now grown in South India, particularly in Kerala and Tamil Nadu.

English ► Java Almond, Kenari Nut.

Folk ► Jangali Baadaam.

Action ► Fruit—laxative. Resin—anti-inflammatory. Tuber—styptic, bechic, diaphoretic.

The essential oil from oleoresin contain 34% anethole and a small quantity of terpenes.

Canarium strictum Roxb.

Synonym ► *C. sikkimense* King

C

Family ► *Burseraceae*

Habitat ► A large, deciduous tree distributed in West Ghats, Assam and Sikkim.

English ► Black Dammar.

Ayurvedic ► Raal Dhuup, Mand Dhuup.

Siddha/Tamil ► Karunkungiliyam (gum).

Action ► Resin—used for chronic cutaneous diseases, such as psoriasis, pityriasis; as a linament in rheumatic affections. Dammer Oil—used for rheumatism, asthma, venereal diseases.

Black dammer resin contains (+)-junenol, canarone and epikhusinal.

The plant contains a sesquiterpene ketone—canarone.

Canarium sikkimense King is known as Gogul Dhuup in Nepal.

Cannabis sativa Linn.

Synonym ► *C. indica* Linn.

Family ► *Cannabinaceae.*

Habitat ► Cultivated all over the country. Commonly occurs in waste grounds, along road side, often becoming gregarious along the irrigation channels of gardens.

English ► Hemp, Indian Hemp.

Ayurvedic ► Vijayaa, Bhangaa, Maadani, Maatulaani, Indraasana, Trailokya-vijayaa, Tribhuvana-vijayaa, Shukranaashana, Ganjaa, Bhangaa. (Bhangaa is consumed orally; Ganjaa and charas are usually smoked.)

Unani ► Bhang, Charas, Qinnab.

Siddha/Tamil ► Ganja.

Folk ► Bhaanga.

Action ► Hallucinogenic, hypnotic, sedative, analgesic, anti-inflammatory, Hemp derivatives are suggested for treating glaucoma and as an antiemetic in cancer chemotherapy. All variants produce initial excitement followed by depression.

Cannabis yields 421 chemicals of various classes—cannabinoids, cannabispirans and alkaloids. More than 60 cannabinoids have been isolated, the most important one is delta-9-tetrahydrocannabinol (THC).

Toxic constituents are readily absorbed, excreted in urine and feces, stored in lipid tissues, especially CNS, crosses placenta. High doses in animals have damaged developing embryos and resulted in birth defects. (Francis Brinker.)

Dosage ► Dried leaves, after removing turbity—125–250 mg powder. (*API* Vol. I.)

Canscora decussata Schult.

Family ► *Gentianaceae.*

Habitat ► Throughout India, ascending to 1,500 m.

Ayurvedic ► Daakuni (used as a substitute for Shankhapushpi in West Bengal)

Unani ► Sankhaahuli.

Folk ► Daankuni.

Action ► Anticonvulsant, CNS depressant, anti-inflammatory, hepatoprotective.

The plant contains calcium 0.38; magnesium 0.16; potassium 1.66 and iron 0.23 g/100 g; copper 18.97, zinc 70.50; manganese 9.60, cobalt 3.15 and chromium 0.60 mcg/g.

Roots contain beta-amyrin, friedelin, genianine and 16 xanthones including mangiferin. Mangiferin is protective activity against induced liver injury in albino rats. Xanthones also showed activity against *Mycobacterium tuberculosis.*

Dried crude powder of the whole plant exhibited anticonvulsant activity in albino rats.

Canscora diffusa (Vahl) R. Br. ex Roem. & Schultes (synonym *C. lawii* Wt.), found throughout India at 1,100 m, is used as a substitute for *C. decussata.*

Canthium parviflorum Lam.

Synonym ► *Plectronia parviflora* (Lam.) Bedd.

Family ► *Rubiaceae.*

Habitat ► Throughout the Deccan Peninsula, from Gujarat and Maharashtra southwards, and in Bihar and Orissa.

English ► Wild Jasmine.

Folk ► Kaari.

Siddha/Tamil ► Karai, Kadan Karai, Nalla Karai, Kudiram.

Action ► Leaves and fruits—astringent, antispasmodic; used against cough. A decoction of the root and leaves is given in flu. Bark—antidysenteric.

The plant contains mannitol (0.5%) and alkaloids. Canthium umbellatum Wight is also known as Kaari.

Capparis aphylla Roth.

Synonym ► *C. decidua* Edgew.

Family ► *Capparidaceae.*

Habitat ► Rajasthan, Punjab and Sindh; southward to Karnataka and Tamil Nadu.

English ► Caper Berry.

Ayurvedic ► Karira, Krakar, Apatra, Granthila, Marubhoo-ruuha, Niguudhapatra, Karila.

Unani ► Kabar, Kabar-ul-Hind, Kabar-e-Hindi; Tenti.

Siddha/Tamil ► Chhengan.

Folk ► Tenti.

Action ► Anti-inflammatory (used for enlarged cervical glands, sciatica, rheumatoid arthritis; externally on swellings, skin eruptions, ringworm). Fruits and seeds—used for urinary purulent discharges and dysentery. Flowers and seeds—antimicrobial. The fruit is used as a pickle.

The root bark contains spermidine alkaloids, used for inflammations, asthma and gout.

Activity of the seed volatiles against *vibro cholerae* has been recorded.

Aqueous extract of the plant exhibits anthelmintic activity; seeds contain antibacterial principles—glucocapparin;

isothiocynate aglycone of glucocapparin.

The blanched fruits, when fed to rats at 10% dietary fibre level, showed a significant hypocholesterolaemic effect, which is attributed to its hemicellose content.

Pickled fruits are use for destroying intestinal worms.

Dosage ▶ Leaf, root—50–125 mg (*CCRAS.*)

Capparis moonii Wight.

Family ▶ *Capparidaceae.*

Habitat ▶ Indigenous to New Zealand. Now distributed in Karnataka and Tamil Nadu.

Ayurvedic ▶ Rudanti.

Action ▶ Fruit—used in puerperal sepsis and septic wounds, also for debility and cough.

EtOH (50%) extract of aerial parts is CNS depressant.

Fruits contain *l*-stachydrine, rutin and beta-sitosterol.

Capparis sepiaria Linn.

Family ▶ *Capparidaceae.*

Habitat ▶ Dry regions of the country, also planted as a hedge plant.

English ▶ Indian Caper.

Ayurvedic ▶ Himsraa, Gridhnakhi, Duh-pragharshaa, Kaakdaani, Kabara, Kanthaari.

Siddha/Tamil ▶ Karunjurai.

Folk ▶ Hains, Kanthaar.

Action ▶ Antiseptic, antipyretic. Used for eczema and scabies.

Leaves contain taraxasterol, alpha- and beta-amyrin and beta-sitosterol, erythrodiol and betulin.

Dosage ▶ Root—5–10 g powder. (CCRAS.)

Capparis spinosa Linn.

Family ▶ *Cappariadaceae.*

Habitat ▶ Native to the Mediterranean region. Distributed in North-west India, Rajasthan, and Peninsular India.

English ▶ Caper Bush.

Ayurvedic ▶ Himsraa, Kaakdaani, Kabara.

Unani ▶ Kabar.

Action ▶ Anti-inflammatory, deobstruent to liver and spleen, diuretic, anthelmintic, vasoconstrictive. Bark—given in splenic, renal and hepatic complaints. Juice of leaves and fruits—anticystic, bactericidal and fungicidal. Dried flower buds—used in scurvy.

Plant gave glucosinolates—glucoiberin, glucocapparin, sinigrin, glucocleomin and glucocapangatin. Rutin has also been reported from plant. The root bark, cortex and leaves gave stachydrine. Stachydrine, when given to dogs, rabbits and rats, quickened the coagulation of blood and reduced loss of blood.

Capparis zeylanica Linn.

Synonym ► *C. horrida* Linn.f.

Family ► *Cappariadaceae.*

Habitat ► Common in plains as a hedge plant.

English ► Ceylon Caper.

Ayurvedic ► Ahimsra (Himsraa and Ahimsra are synonyms). Vyaaghranakhi.

Siddha/Tamil ► Aathondai.

Folk ► Kareruaa.

Action ► Root bark—sedative, stomachic, anticholerin, diuretic febrifuge. Leaves—applied as poultice to piles, swellings, boils.

The plant contains a saponin and *p*-hydroxybenzoic, syringic, vanillic, ferulic and *p*-coumaric acids. The leaves contain beta-carotene. The leaves and seeds contain glucocapparin, alpha-amyrin, n-triacontane and a fixed oil.

Aerial parts exhibited spasmolytic activity.

Capsella bursa-pastoris (Linn.) Moench.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Throughout India as a weed in cultivated areas and waste places, particularly in the temperate regions up to an altitude of 4,200 m.

English ► Shepherd's Purse, St. James's Wort.

Folk ► Mumiri.

Action ► The herb or its juice extracts are employed to check menorrhagia and haemorrhages from renal and genitourinary tract. Also used in diarrhoea and dysentery and as a diuretic.

Key application ► In symptom-based treatment of mild menorrhagia and metrorrhagia. (*German Commission E.*) *The British Herbal Pharmacopoeia* reported antihaemorrhagic action.

Aerial parts contain flavonoids, polypeptides, choline, acetylcholine, histamine and tyramine.

The extract of dried or green plant causes strong contraction of the small intestines and uterus of guinea pigs. A quarternary ammonium salt has been isolated from the herb which is reported to be responsible for its pharmacological activity.

Young leaves contain vitamin A (5,000 IU/100 g) and ascorbic acid (91 mg/100 g); among other constituents are hesperidin and rutin, which reduced permeability of blood vessel walls in white mice. A neoplasm inhibitory substance has been identified as fumaric acid. An inhibitory effect of the extracts of the herb on Ehrlich solid tumour in mice was found to be due to the fumaric acid.

Major constituent of the essential oil is camphor.

Capsicum annuum Linn.

Family ► *Solanaceae.*

Habitat ► Native to the West Indies and tropical America; now cultivated throughout tropical regions of India.

C

English ► Chilli, Red Pepper.

Ayurvedic ► Raktamaricha, Lankaa, Katuviraa.

Unani ► Mirch, Filfil-e-Ahmar, Filfl-e-Surkh, Surkh Mirch.

Siddha/Tamil ► Milagay.

Action ► Stimulant, accelerates oxygenation of cells, encourages adrenal glands to produce corticosteroids, increases gastrointestinal secretion. Carminative, antispasmodic, antiseptic. Used externally for rheumatism, backache, lumbago, neuralgia, painful muscle spasm.

Red chilli contains capsaicin (0.1–1.5%), carotenoids, flavonoids, volatile oil; steroidal saponins (capsicidins, only in seeds).

Capsaicin stimulates the circulation and alters temperature regulation; topically desensitizes nerve endings and acts as a local analgesic.

Capsaicin produces a protective effect in rat lung and liver by strengthening the pulmonary antioxidant enzyme defence system. Acute capsaicin treatment causes release of substance desensitization of the respiratory tract mucosa to a variety of lung irritants.

Red pepper or an equivalent amount of capsaicin, when fed along with cholesterol-containing diets to female albino rats, prevented significantly the rise of liver cholesterol levels.

Vitamin P has been isolated from the chillies. Vitamin C gradually increases during maturation and reaches maximum at the semi-ripe or pink coloured stage and decreases thereafter.

Capsaicin exhibited a hypoglycaemic effect in dogs; insulin release was increased. (*Phytother Res,* 2001, Aug 15(5), 391–4.)

Dosage ► Fruit—30–60 mg powder. (*CCRAS.*)

Capsicum frutescens Linn.

Family ► *Solanaceae.*

Habitat ► Cultivated as a condiment crop.

English ► Bird Chilli.

Ayurvedic ► Katuviraa.

Unani ► Surkh Mirch.

Siddha/Tamil ► Musi Milagay.

Action ► See *Capsicum annuum.*

Key application ► Externally, in painful muscle spasms in areas of shoulder, arm and spine; for treating arthritis, rheumatism, neuralgia, lumbago and chilbains. (*German Commission E.*) *The British Pharmacopoeia* reported rubefacient and vasostimulant action.

The plant contains hydroxybenzoic acid, hydroxycinnamic acid and ascorbic acid. Fruits contain up to 1% of capsaicin.

Carallia brachiata (Lour.) Merr.

Synonym ► *C. integerrima* DC. *C. lucida* Roxb. ex Kurz.

Habitat ► Throughout India, up to an altitude of 1,300 m, and in the Andamans.

Folk ► Karalli, Kierpa. Varanga (Malyalam).

Action ► Leaves—used in the treatment of sapraemia. Bark—used for treating oral ulcers, stomatitis, inflammation of the throat.

The leaves contain alkaloids (0.2% dry basis), the major being (+)-hygroline.

Cardiospermum halicacabum Linn.

Family ► *Sapindaceae.*

Habitat ► Throughout the plains of India, as a wild climber.

English ► Ballon Vine, Winter Cherry, Heartseed.

Ayurvedic ► Kaakatiktaa, Kaakaadani, Karnsphotaa, Shatakratulataa.

Unani ► Habb-e-Qilqil.

Siddha/Tamil ► Mudukottan, Kottavan.

Folk ► Kanphotaa, Kanphuti, Lataaphatakari. Used as Jyotishmati in Bengal.

Action ► Used in rheumatism, lumbago, skeletal fractures, nervous diseases, amenorrhoea, haemorrhoids, erysipelas. The herb is used in hairoils for treating dandruff, alopecia and for darkening hair.

The plant extract showed significant analgesic and anti-inflammatory activity and sedative effect on CNS. The drug also showed (transient) vasodepressant activity.

The leaves contain beta-sitosterol and its D-glucoside, an alkaloid, oxalic acid and amino acids. The presence of a saponin and quebrachitol is reported in the plant.

The leaves and stem are used in preparations used against common cold. Alcoholic extract of the plant exhibits antisickling and antiarthritic activity. Seeds have positive anabolic activity and increase body weight by inducing a positive nitrogen balance.

The alkaloid fraction from the seeds showed hypotensive activities and cardiac inhibition in anaesthetized dogs; blocked spasmogenic effects of acetylcholine, histamine and 5-HT on guinea pig ileum, biphasic effort on frog rectus abdominis muscle. The seeds also showed antibacterial activity.

Dosage ► Whole plant—50–100 ml decoction. (*CCRAS.*)

Careya arborea Roxb.

Family ► *Barringtoniaceae.*

Habitat ► Sub-Himalayan tract, from Jammu eastwards to West Bengal, Madhya Pradesh and Tamil Nadu.

English ► Kumbi, Slow-Match tree.

Ayurvedic ► Katabhi, Kumbhika, Kumbhi, Kumbi, Kaitrya, Kumudikaa.

Siddha/Tamil ► Kumbi, Ayma.

Action ► Bark—demulcent (in coughs and colds), antipyretic and antipruritic (in eruptive fevers), anthelmintic, antidiarrhoeal. An infusion of flowers is given after child birth.

C

Seeds contain triterpenoid sapogenols, sterols; leaves contain a triterpene ester, beta-amyrin, hexacosanol, taraxerol, beta-sitosterol, quercetin and taraxeryl acetate.

Careya herbacea Roxb., a related species, is known as Kumbhaadu-lataa in Bengal.

Dosage ► Bark—50–100 ml decoction. (*CCRAS.*)

Carica papaya Linn.

Family ► *Caricaceae.*

Habitat ► Native to West Indies and Central America; now cultivated in Uttar Pradesh, Punjab, Rajasthan, Gujarat, Maharashtra and South India.

English ► Papaya, Papaw.

Ayurvedic ► Erand-karkati, Papitaa.

Unani ► Papitaa Desi.

Siddha/Tamil ► Pappaali, Pappayi.

Action ► Ripe fruit—stomachic, digestive, carminative, diuretic, galactagogue. Useful in bleeding piles, haemoptysis, dysentery and chronic diarrhoea. Seeds—emmengagogue, abortifacient, vermifuge. Juice of seeds is administered in enlarged liver and spleen, and in bleeding piles.

Key application ► Papain, the enzyme mixture extracted from raw papain (latex of *Carica papaya*), has been included among unapproved herbs by *German Commission E.* Experiment-based as well as clinical research indicate that papain may be effective (in the treatment of inflammations) in high doses (daily dose 1500 mg corresponding to 2520 FIP units).

Unripe fruit—emmengagogue and abortifacient. Latex—applied topically on eczema, ringworm, psoriasis, corns, warts, sloughing wounds, carbuncles and eschar of burns.

Green parts of the plant and seed contain an alkaloid carpaine. Seeds also contain carpasemine.

Latex contain enzymes—papain and chymopapain and alkaloids carpaine and pseudocarpaine. A proteinaceous material from latex showed anticoagulant activity; in higher doses it is heart depressant and as a spasmogen on smooth muscle of guinea pig ileum. An alkaloid solution showed depressant action on heart, blood pressure and intestine.

The anthelmintic action of seeds against *Ascaris lumbricoides* is due to carpasemine.

Papain, an enzyme mixture prepared from the fruit, seeds and leaf, hydrolyses polypeptides, amides and esters, particularly when used in an alkaline environment, and is used in digestive disorders.

Papain inhibits platelet aggregation, which may further increase the risk of bleeding in patients also taking anticoagulants. Concurrent administration of cyclophosphamide with papain caused sever damage to lung tissues in rats. (Sharon M. Herr.)

Chymopapin C is an immunosuppressive enzyme from plant extract. Carpaine, extracted from the plant,

exhibited anti-tubercular activity, also antitumour *in vitro,* and hypotensive.

Dosage ► Leaf—40–80 ml infusion; latex—3–6 g (*CCRAS.*)

Carissa carandas Linn. var. congesta (Wt.) Bedd.

Family ► *Apocynaceae.*

Habitat ► Throughout India.

English ► Christ's Thorn, Bengal Currant.

Ayurvedic ► Karinkaara, Karamarda, Krishnapaakphal, Kshirphena, Sushena, (Karamardakaa is equated with *C. spinarum* Linn.)

Unani ► Karondaa.

Siddha/Tamil ► Kalakke.

Action ► Used for acidity, flatulence, poor digestion, as a slimming diet. Juice of the fresh plant is used for infected wounds that refuse to heal. Root—paste used for diabetic ulcer.

The Ayurvedic Pharmacopoeia of India indicated the stem bark in obstinate skin diseases, and the root in urinary disorders.

Alcoholic extract of roots exhibit hypotensive activity. Roots yield cardioactive compounds; cardiotonic activity is due to glucoside of odoroside H.

Fresh fruits are rich in ascorbic acid (105 g/100 g fruit juice). The seeds are rich in potassium (360 mg/100 g fresh matter).

Dosage ► Stem bark—48 g for decoction. (*API* Vol. II); root—1–3 g (*API* Vol. III).

Carissa opaca Stapf. Ex Haines.

Synonym ► *C. spinarum* auct. non L.

Family ► *Apocynaceae.*

Habitat ► Throughout the country in dry regions, especially in Punjab and Kashmir.

Ayurvedic ► Karamardikaa.

Siddha/Tamil ► Chirukila Chiru.

Folk ► Jangali Karondaa. Garnaa (Punjab).

Action ► Plant—cardiotonic. Root—purgative.

The root contains caffeic acid, cardiac glycosides—odorosides B, C, G and H, and evomonoside.

Carissa paucinervia A. DC. is also equated with the wild var. of Karondaa.

Carthamus tinctorius Linn.

Family ► *Asteraceae.*

Habitat ► Cultivated mainly as an oil-seed crop in Madhya Pradesh, Maharashtra.

English ► Safflower.

Ayurvedic ► Kusumbha, Vahinshikhaa, Vastraranjaka, Kusum.

Unani ► Qurtum.

Siddha/Tamil ► Chendurakam.

Action ► Oil—aids prevention of arteriosclerosis, coronary heart disease and kidney disorders as a polyunsaturated fat. Flowers—stimulant, sedative, diuretic, emmenagogue; used in fevers and eruptive skin conditions, measles.

Charred safflower oil is used in rheumatism and for healing sores.

Key application ► Dried flowers—in cardiovascular diseases, amenorrhoea, dysmenorrhoea and retention of lochia; also in wounds and sores with pain and swelling. (*Pharmocopoeia of the People's Republic of China*, 1997.)

Safflower contains carthamone, lignans and a polysaccharide. The polysaccharide, composed of xylose, fructose, galactose, glucose, arabinose, rhamnose and uronic acid residues, stimulates immune function in mice. It induced antibody formation in mice following peritoneal injection. Extracts of flowers have also been tested in China on blood coagulation, where a prolongation of clothing time was observed and platelet aggregation inhibited. Chinese research indicates that Safflower flowers can reduce coronary artery disease, and lower cholesterol levels. Flowers and seeds exhibit lipase activity. The flower extract also exhibited anti-inflammatory, sedative and analgesic effect and inhibitory effect on spontaneous motor activity.

The plant contains a propanetriol derivative, which can be used for the treatment of circulatory disorders.

Recent research suggests that improving the lipid profile might not be as important to reducing the risk of cardiovascular disease as suggested. (*Natural Medicines Comprehensive Database, 2007.*)

Safflower is contraindicated in pregnancy, gastric disorders, excessive menstruation, haemorrhagic diseases.

Wild and thorny Safflower, growing in the arid tract of Haryana and Punjab (locally known as Kantiaari, Poli, Poiyan) is equated with *C. oxycantha* Bieb. The plant is diuretic. Seed oil is applied topically to ulcers. The plant contains a sesquiterpene glycoside. Aerial parts contain hinesol-beta-D-fucopyranoside. The plant also contains luteolin-7-glucoside.

Dosage ► Leaf—3–6 g powder. (*CCRAS.*)

Carum bulbocastanum W. Koch.

Synonym ► *Bunium persicum* (Boiss.) Fedts.

Family ► *Umbelliferae; Apiaceae*

Habitat ► Cultivated in the hills and plains of North India and in the hills of South India.

English ► Black Caraway.

Ayurvedic ► Krishna jiraka, Kaashmira jirak.

Unani ► Jiraa Siyaah, Kamoonarmani.

Siddha/Tamil ► Shemai-shiragam, Pilappu-shiragam.

Action ► See *C. carvi.*

Carum carvi Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Europe and West Asia. Now cultivated in Bihar, Orissa, Punjab, Bengal, Andhra Pradesh, and in the hills of Kumaon, Garhwal, Kashmir and Chamba.

Also found wild in the North Himalayan regions.

English ► Caraway.

Ayurvedic ► Krishna jiraka, Jiraa, Kaaravi, Asita Jiraka, Kaashmira-jiraka, Prithvikaa, Upakunchikaa, Sugandha Udgaar, Shodhana.

Unani ► Zeeraa Siyaah, Kamoon, Kamoon-roomi.

Siddha/Tamil ► Shimai-shembu, Semai Seearagam, Karamjiragam.

Action ► Carminative, antispasmodic, antimicrobial, expectorant, galactagogue, emmenagogue.

Key application ► Seed oil—in dyspeptic problems, such as mild, sapstic conditions of the gastrointestinal tract, bloating and fullness. (*German Commission E, ESCOP, The British Herbal Pharmacopoeia.*) *The Ayurvedic Pharmacopoeia of India* recommended the seed in chronic fevers.

The fruit contains a volatile oil consisting of carvone (40–60%) and limoline with other constituents; flavonoids, mainly quercetin derivatives, polysaccharides and a fixed oil; also calcium oxalate.

The antispasmodic and carminative effects have been confirmed experimentally. The caraway has shown to reduce gastrointestinal foam.

Both the seeds and the essential oil are classed as carminative in I.P.

The essential oil shows moderate antibacterial and antifungal activity against several bacteria and fungi. Mixed with alcohol and castor oil, it is used for scabies.

Dosage ► Seed—1–3 g powder. (*CCRAS.*)

Casearia esculenta Roxb.

Synonym ► *C. ovata* (Lamk) Willd.*C. zeylanica* (Gaertn.) Thw.

Family ► *Samydaceae; Flacourtiaceae*

Habitat ► Peninsular India, up to 1,800 m.

Ayurvedic ► Saptachakraa.

Siddha/Tamil ► Kakkaipilai, Kilar, Kottargovai.

Folk ► Saptrangi (root and root bark).

Action ► Root—antidiabetic (used in milder chronic diabetic cases), astringent, liver tonic. Frequently adulterated with the roots of *Salacia chinensis* Linn. and *S. macrosperma* Wight.

The crude aqueous extract of the roots has shown hypoglycaemic activity.

The root gave leucopelargonidin, beta-sitosterol, dulcitol, a flavonoid and arabinose.

Casearia tomentosa Roxb.

Synonym ► *C. elliptica* Willd.

Family ► *Samydaceae; Flacourtiaceae.*

Habitat ► The Himalayas from Kashmir to Nepal, ascending to 1,000 m; throughout tropical India.

Ayurvedic ► Chilhaka.

Siddha/Tamil ► Kadichai.

C

Folk ► Chillaa, Saptrangi.

Action ► Root—hypoglycaemic. Root bark is used as a tonic in anaemic conditions.

Fruit pulp—diuretic, purgative, Leaves—anti-inflammatory. Fruit pulp —diuretic.

Ethanolic (80%) extract of the leaves showed significant anti-inflammatory activity in rats. Oil extracted from the seeds in rubbed on sprains. Various plant parts are used in neuralgia.

Cassia absus Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Throughout India.

Ayurvedic ► Chakshushyaa, Aranyakulathhikaa, Kataka.

Unani ► Chaaksu.

Siddha/Tamil ► Muulaipalyirai, Kaattukollu.

Folk ► Ban Kulathi.

Action ► Seed—bitter, blood-purifier, astringent, stimulant, diuretic. Used topically for leucoderma, ringworm, venereal ulcers and other skin diseases. Roots—purgative.

Seeds gave sitosterol-beta-D-glucoside and alkaloids—chaksine and isochaksine. Chaksine is found to be antibacterial against *Micrococcus pyogenes* var. *aureus* and *Streptococcus haemolyticus.* It stimulates contraction of different tissues of plain muscles, like uterus, intestine, bladder, and muscles in blood vessels. It depresses the parasympathetic nerve-endings of certain organs like intestine and bladder. Chaksine has ganglion-blocking property. Chaksine and isochaksine possess a local anaesthetic effect intradermally. It produces a sustained fall in blood pressure of anaesthetized animals and produces a weak anti-acetylcholine effect. Roots also contains anthraquinones and aloe-emodin.

Dosage ► Seed—3–6 g powder. (*CCRAS.*)

Cassia alata Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Native to the West Indies. Found wild almost throughout India.

English ► Ringworm Cassia.

Ayurvedic ► Dadrughna, Dadrumardana.

Siddha ► Malanthakerai, Seemai agathi (Tamil).

Folk ► Daadmaari.

Action ► Leaf—used in skin diseases like herpes, blotch, eczema, mycosis (washerman's itch). Dried leaves—in leprosy. A strong decoction is used for ringworm, eczema and herpes. Leaves are also used as a purgative.

Young pods contain rhein, emodin and aloe-emodin. The antibacterial activity of the leaves is reported to be due to rhein. The roots contain anthraquinone. Emodin, aloe-emodin and anthraquinone contribute to the purgative activity of the leaves and roots. Crushed leaves or roots are

rubbed on to the skin to cure ringworm and to control *Tinea imbricata,* a skin fungus.

Cassia angustifolia Vahl.

Synonym ► *C. senna* Linn. var. *senna.*

Family ► *Caesalpiniaceae.*

Habitat ► Native to Sudan and Arabia. Now cultivated mainly in Tirunelveli and Ramnathpuram districts and to a lesser extent in Madurai, Salem and Tiruchirapalli districts of Tamil Nadu. Also grown on a small scale in Cuddapah district of Andhra Pradesh and certain parts of Karnataka.

English ► Indian Senna, Tinnevelly Senna.

Ayurvedic ► Svarna-pattri, Maarkandikaa, Maarkandi.

Unani ► Sannaa, Sanaa-makki, Senaai, Sonaamukhi, Sanaa-Hindi.

Siddha/Tamil ► Nilaavaarai.

Folk ► Sanaai.

Action ► Purgative (free from astringent action of rhubark type herbs, but causes gripe), used in compounds for treating biliousness, distention of stomach, vomiting and hiccups. Also used as a febrifuge, in splenic enlargements, jaundice, amoebic dysentery. Contraindicated in inflammatory colon diseases.

Key application ► Leaf and dried fruit—in occasional constipation. (*German Commission E.*) As a stimulant laxative. (*The British Herbal Pharmacopoeia.*) 1,8-dihydoxy-anthracene derivatives have a laxative effect. This effect is due to the sennosides, specifically, due to their active metabolite in the colon, rheinanthrone. The effect is primarily caused by the influence on the motility of the colon by inhibiting stationary and stimulating propulsive contractions. (*German Commission E, ESCOP, WHO.*) Seena has been included in I.P. as a purgative.

Most of the *Senna* sp. contain rhein, aloe-emodin, kaempferol, isormamnetin, both free and as glucosides, together with mycricyl alcohol. The purgative principles are largely attributed to anthraquinone derivatives and their glucosides.

Senna is an Arabian name. The drug was brought into use by Arabian physicians for removing capillary congestion (pods were preferred to leaves).

The active purgative principle of senna was discovered in 1866.

Cassia *acutifolia* Delile is also equated with Maarkandikaa, Svarna-pattri, Sanaai.

Dosage ► Leaves—500 mg to 2 g (*API* Vol. I.)

Cassia auriculata Linn.

Family ► *Caesalpiniaceae.*

Habitat ► Wild in dry regions of Madhya Pradesh, Tamil Nadu and Rajasthan. Cultivated in other parts of India.

English ► Tanner's Cassia.

C

Ayurvedic ► Aaavartaki, Aaadaari.

Unani ► Tarwar.

Siddha/Tamil ► Aavaarai.

Folk ► Tarwar.

Action ► Roots—used in skin diseases and asthma. Flowers enter into compounds for diabetes, urinary disorders and nocturnal emissions.

Pod husk contains nonacosane and nonacosan-6-one, chrysophanol, emodin and rubiadin.

Dosage ► Whole plant—50–100 ml (*CCRAS.*)

Cassia fistula Linn.

Synonym ► *C. rhombifolia* Roxb.

Family ► *Caesalpiniaceae.*

Habitat ► Cultivated as an ornamental throughout India.

English ► Indian Laburnum, Purging Cassia, Golden Shower.

Ayurvedic ► Aaragvadha, Chaturaangula, Kritamaala, Kritmaalaka, Karnikaara, Shampaaka, Praagraha, Raajvrksha, Nripapaadapa, Raajadruma, Vyaadhighaataka, Aarevata.

Unani ► Amaltaas, Khyaarshambar.

Siddha/Tamil ► Sarakkonrai.

Folk ► Amaltaasa.

Action ► Flowers and pods—purgative, febrifugal, astringent, antibilious. Seed powder—used in amoebiasis.

The Ayurvedic Pharmacopoeia of India indicated the fruit pulp for constipation, colic, chlorosis and urinary disorders.

Pulp of the pod contains anthraquinone glycosides, sennosides A and B, rhein and its glucoside, barbaloin, aloin, formic acid, butyric acid, their ethyl esters and oxalic acid. Presence of pectin and tannin is also reported.

Seeds gave galactomannan free sugars and free amino acids; extract laxative, carminative, cooling and antipyretic properties.

Flowers gave ceryl alcohol, kaempferol, rhein and a bianthraquinone glycoside, fistulin.

Leaves gave free rhein, its glycosides—sennosides A and B.

Cassia javanica L., a related species found in West Bengal, Maharashtra and Tamil Nadu, is used as a substitute for *Cassia fistula*.

Dosage ► Fruit pulp—5–10 g powder. (*API* Vol. I.)

Cassia obovata (L.) Collad.

Synonym ► *C. obtusa* Roxb.

Family ► *Calsalpiniaceae.*

Habitat ► Punjab, Delhi, Rajasthan, Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Kerala and Tamil Nadu.

English ► Spanish, Sudan Senna.

Ayurvedic ► Maarkandikaa, Svarnapattri. (related species)

Folk ► Sonaamukhi, Sanaai.

Action ► An adulterant of the true senna. Leaves and seeds—purgative and anthelmintic.

Cassia obtusifolia Linn.

Family ► *Calsalpiniaceae.*

Habitat ► From Jammu and Himachal Pradesh to West Bengal, also in central and western India, up to an altitude of 1,200 m.

Ayurvedic ► Chakramarda, Prapunnaada.

Folk ► Chakondaa, Chakwar, Pumariaa.

Action ► Pods—Antidysenteric, antibacterial, antifungal. Seeds—used for ringworm and skin diseases also for cough, cold, asthma, and as a mild purgative in liver complaints.

Cassia occidentalis Linn.

Family ► *Calsalpiniaceae.*

Habitat ► Throughout India, up to an altitude of 1,500 m.

English ► Coffee Senna, Foetid Cassia, Negro Coffee.

Ayurvedic ► Kaasamarda, Kaasaari.

Unani ► Kasondi.

Siddha/Tamil ► Paeyaavarai, Thagarai.

Folk ► Kasondi (bigger var.).

Action ► Purgative, diuretic, febrifugal, expectorant, stomachic. Leaves—used internally and externally in scabies, ringworm and other skin diseases. A hot decoction is given as an antiperiodic. Seeds—used for cough, whooping cough and convulsions. Roasted seeds (roasting destroys the purgative property) are mixed with coffee for strength.

The pods contain sennosides and anthraquinones; seeds polysaccharides, galactomannan; leaves dianthronic hetroside; pericarp apigenin; roots emodol; plant xanthone—cassiolin; seeds phytosterolin; flowers physcion and its glucosides, emodin and beta-sitosterol.

The volatile oil obtained from the leaves, roots and seeds showed antibacterial and antifungal activity.

The seeds, when fed to animals, resulted in weight loss and also were found to be toxic to experimental animals. Leaves are preferred to quinine as a tonic, seeds are considered as a haemateinic toxic and root is used as a hepatic tonic.

Dosage ► Seed—3–6 g powder; leaf—10–20 ml juice; root bark—50–100 ml decoction. (*CCRAS.*)

Cassia sophera Linn.

Family ► *Calsalpiniaceae.*

Habitat ► In gardens as hedge throughout India.

English ► Sophera Senna.

Ayurvedic ► Kaasamarda.

Unani ► Kasondi.

Siddha/Tamil ► Ponnaavaarai.

Action ► Leaves, seeds, bark—cathartic; considered specific for

ringworm and other skin diseases (bark may cause dermatitis); used for bronchitis and asthma.

C

A paste of leaves is used for treating piles. An infusion of fresh leaves, with sugar, is given in jaundice. Plant is spasmolytic. Alcoholic extract of leaves is intestinal and bronchial muscle relaxant.

The leaves contain a flavone glycoside and sennoside. Root bark contains anthraquinones, chrysophanol, physcion and beta-sitosterol. Heartwood gave isomeric derivatives, 1,2, 7-trihydroxy-3-methylanthraquinone, along with sopheranin, beta-sitosterol, chrysophanol, physcion, emodin, 1-octadecanol and quercetin.

Cassia tora Linn.

Family ► *Calsalpiniaceae.*

Habitat ► Throughout India as a weed.

English ► Sickle Senna, Ringworm Plant.

Ayurvedic ► Chakramarda, Chakri, Prapunnaada, Dadrughna, Meshalochana, Padmaata, Edagaja.

Unani ► Penwaad Taarutaa.

Siddha/Tamil ► Ushittgarai.

Folk ► Chakavad, Daadamaari.

Action ► Leaves—taken internally to prevent skin diseases; applied against eczema and ringworm; pounded and applied on cuts, act like tincture of iodine. Seeds, soaked in water, are taken for spermatorrhoea. A paste made of equal parts of leaves and seeds is given for jaundice. Pods are used in dysentery.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the seed in paralysis and hemiplegia as a supporting drug.

The leaves contain chrysophanol, aloe-emodin, rhein and emodin. Mature leaves possess purgative properties and are sometimes utilized to adulterate the true senna; also used as an antiperiodic and anthelmintic.

The leaf extract exhibited antifungal activity against the ringworm fungus Microsporon nanum.

Seeds contain anthraquinone glycosides, naptho-pyrone glycosides, cassiaside and rubrofusarin-6-beta-gentiobioside. These constituents showed significant hepatoprotective activity.

Thrachrysone, isolated from seeds, showed stronger antioxidant activity than tocopherol and BHA.

Chrysophanic acid-9-anthrone, extracted from the seed, was found to be active against ringworm fungi.

Dosage ► Seed—1–3 g powder. (*API* Vol. III.)

Cassytha filiformis Linn.

Family ► *Lauraceae*

Habitat ► Throughout the greater parts of India.

English ► Doddar-Laurel, Love-Vine.

Ayurvedic ► Amarvalli, Aakaashbel. (*Cuscuta reflexa* is also known as Amarvalli.)

Siddha/Tamil ► Erumaikkottan.

Action ► Astringent, diuretic (given in dropsy and anasarca, also in biliousness, chronic dysentery, haemoptysis and for supressing lactation after still-birth); piscicidal and insecticidal (used as a hair-wash for killing vermin).

The plant contains aporphine alkaloids.

Castanea sativa Mill.

Synonym ► *C. vulgaris* Lam.

Family ► *Fagaceae.*

Habitat ► Darjeeling, Khasi Hills, Punjab and Himachal Pradesh.

English ► Spanish Chestnut, Sweet Chestnut.

Folk ► Singhaaraa (not to be confused with water-chestnut, *Tripa natans* L.)

Action ► Leaves—astringent, antitussive and febrifuge (used for fevers and diseases of the respiratory tract). An infusion is used as a gargle in pharyngitis, proxysmal coughs, catarrh and whooping cough. Nuts—extract, as platelet inhibitor in thrombosis and atherosclerosis.

The leaves contain tannins (8–9%) flavone glycosides, triterpenoids, ursolic acid, lupeol and betulin. Heartwood contains 61.4% tannins and 25.7% non-tannins. The wood and bark contain 7–14 and 8–14% tannins respectively.

Nuts are eaten raw, roasted or boiled like potatoes. Nuts contain protein, calcium, phosphorus, thiamine, riboflavin and niacin; also tocopherols. Nuts, crushed with vinegar and barley flour, are used against indurations of breast. The extract of nuts exhibits possibility of its use as a platelet inhibitor in thrombosis and atherosclerosis. Leaves are inhibitors of pectinolytic enzymes.

American chestnut and European chestnut are equated with *Castanea dentata* and *C. sativa,* respectively. Both are used for respiratory ailments.

Casuarina equisetifolia Linn.

Family ► *Casuarinaceae.*

Habitat ► Cultivated in coastal regions of Peninsular India.

English ► Casuarina, She-Oak, Australian or Whistling Pine, Beefwood.

Ayurvedic ► Jhaau, Vilaayati Jhaau.

Siddha/Tamil ► Savukku.

Action ► Bark—astringent, antidiarrhoeal. Leaf—antispasmodic, used in colic. Aerial parts—hypoglycaemic.

The plant contains kaempferol glycoside, quercetin glycoside, cupressuflavone, tannins, shikimic acid, quinic acid, amino acids, sugars.

Catharanthus roseus (L.) G. Don.

Synonym ► *Vinca rosea* L.
Lochnera rosea (L.) Reichub.

Family ► *Apocynaceae.*

C

Habitat ► Commonly grown in Indian gardens.

English ► Madagascar Periwinkle (*Vinca major* L. Pich. and *Vinca minor* Linn. are known as Greater Periwinkle and Lesser Periwinkle respectively).

Folk ► Sadaabahaar, Nayantaaraa, Nityakalyaani.

Action ► The cytotoxic dimeric alkaloids, present in Madagascar Periwinkle, *Catharanthus roseus* L. Don, *Vincea rosea* L., and used for the treatment of certain type of cancer, have not been found in *V. major.*

Catharanthus roseus (Madagascar Periwinkle) : cytostatic, anti-neoplastic, slows down growth of cells by supressing immune response. Vinblastine and Vincristine are said to prolong remission of leukaemia to more than five years. These chemotherapeutic agents are toxic to the nervous system. Vinblastine is also used for breast cancer and Hodgkin's disease.

Vinca major L. Pich. (Greater Periwinkle): astringent, anti-haemorrhagic; used for menorrhagia and leucorrhoea. Contains indole alkaloids including reserpinine and serpentine; tannins.

Vinca minor Linn. (Lesser Periwinkle): astringent; circulatory stimulant. Leaves—stomachic and bitter. Root—hypotensive. Used for gastric catarrh, chronic dyspepsia, flatulence; also for headache, dizziness, behaviours disorders. A homoeopathic tincture is given for internal haemorrhages.

Cayratia carnosa (Wall.) Gagnep.

Synonym ► *C. trifolia* (L.) Domin.
Vitis carnosa Wall.
V.trifolia Linn.

Family ► *Vitaceae.*

Habitat ► Throughout the warmer parts of India, from Jammu and Rajasthan to Assam and up to 300 m.

Ayurvedic ► Gandira.

Siddha/Tamil ► Tumans.

Action ► Leaves, seeds, roots—astringent, applied to ulcers and boils. Leaves—diaphoretic (recommended in high fever). Root-given in anaemic conditions. Aerial parts—CNS active, hypothermic. The stems, leaves and roots contain hydrocyanic acid. Presence of delphinidin and cyanidin is reported in the leaves.

Cayratia pedata (Wall.) Gagnep.

Synonym ► *Vitis pedata* Vahl ex Wall.

Family ► *Vitaceae.*

Habitat ► Bihar, West Bengal and Assam, up to 900 m.

Ayurvedic ► Godhaapadi.

Siddha/Tamil ► Kattuppirandai.

Action ► Leaves—astringent and refrigerant (used for ulcers, diarrhoea, uterine and other fluxes).

Aerial parts—diuretic, spasmolytic.

Cedrela toona Roxb.

Synonym ► *Toona ciliata* M. Roem.

Family ► *Meliaceae.*

Habitat ► Sub-Himalayan tract, Assam and throughout hilly regions of Central and South India.

English ► Red Cedar, Toon, Indian Mahogany tree.

Ayurvedic ► Tuunikaa, Nandi Vrksha.

Siddha/Tamil ► Tunumaram, Santhana Vembu.

Folk ► Toonaa.

Action ► Bark—astringent, antidysenteric, antiperiodic. Flowers—emmenagogue. Leaf—spasmolytic, hypoglycaemic, antiprotozoal.

Bark and heartwood yielded tetranortriterpenoids, including toonacilin. Heartwood also gave a coumarin, geranylgernalol and its fatty esters. Toonacilin and its 6-hydroxy derivatives are antifeedant.

Cedrus deodara (Roxb.) Loud.

Synonym ► *C. libani* Barrel. var. *deodara* Hook. f.

Family ► *Pinaceae.*

Habitat ► North-western Himalayas from Kashmir to Garhwal, from 1,000 to 3,500 m.

English ► Himalayan Cedar, Deodar.

Ayurvedic ► Devadaaru, Suradruma, Suradaaru, Devakaashtha, Devadruma, Saptapatrika, Daaru, Bhadradaaru, Amarataru, Amaradaaru, Daaruka, Devaahvaa, Surataru, Surabhuruha.

Unani ► Deodaar.

Siddha/Tamil ► Thevathaaram.

Action ► Bark—decoction is used internally as astringent, antidiarrhoeal and febrifuge. Essential oil—antiseptic (used in skin diseases).

The Ayurvedic Pharmacopoeia of India indicated the use of the heartwood in puerperal diseases.

The wood contains sesquiterpenoids; exhibits sapasmolytic activity. Alcoholic extract of the wood showed marked anti-inflammatory activity in mice; alcoholic extract showed antibacterial activity.

The wood possesses diaphoretic, diuretic and carminative properties, and is used in fevers and in pulmonary and urinary disorders.

Himalayan Cedarwood Oil contains two major sesquiterpenoids—alpha- and beta-himchalenes. Presence of butyric and caproic acids is also reported. The oil shows *in vitro* antibacterial and antifungal activity. It increases vascular permeability. Needles, on steam distillation, yield a volatile oil, rich in borneol and its esters. An alcoholic extract of the needles shows significant antibacterial activity against diptheria bacteria. The juice shows antiviral activity against tobacco mosaic virus and potato virus.

The bark contains 8-C methyltaxifoline, dihydroquercetin, 8-C methylquercetin, quercetin, sitosterol, and tannins 8.25%, non-tannins 6.95% (varies with the age of the tree). An alcoholic extract of the bark shows significant activity against diptheria bacteria; aqueous extract of the dried bark showed anti-inflammatory activ-

ity against acute and chronic inflammations. Aqueous extract of the bark is found effective in reducing sugar content of diabetic patient's urine and blood to normal levels.

Dosage ▶ Heartwood—3–6 g powder. (*API* Vol. IV.)

Ceiba pentandra (Linn.) Gaertn.

Synonym ▶ *Eriodendron anafractuosum* DC.

Family ▶ *Bombacaceae.*

Habitat ▶ West and South India. Often found planted around villages and temples.

English ▶ Kapok, White Silk Cotton.

Ayurvedic ▶ Kuuta-Shaalmali, Shveta Shaalmali.

Siddha/Tamil ▶ Ielavum (Tamil).

Action ▶ Gum—laxative, astringent, demulcent (given in painful micturition). Unripe fruit—astringent. Root—diuretic, antidiabetic, antispasmodic (used in dysentery). Flowers—laxative; used in lochiorrhoea. Unripe pods—used in vertigo and migraine. Seed oil—used in rheumatism.

The plant contains linarin (acacetin 7-rutinoside). Seeds contain fatty acids, diglycerides and phospholipids. Leaves are considered a good source of iron and calcium. Stem-bark extract—antimicrobial.

Celastrus paniculatus Willd.

Family ▶ *Celastraceae.*

Habitat ▶ Sub-Himalayan tract up to 2,000 m and South Indian hills.

English ▶ Staff tree, Intellect tree.

Ayurvedic ▶ Jyotishmati, Paaraavatpadi. Kangunikaa, Kanguni, Vegaa, Maalkaanguni, Svarnalatikaa, Kaakaandaki, Katuveekaa.

Unani ▶ Maalkangani.

Siddha/Tamil ▶ Vaaluluvai.

Action ▶ Seeds—nervine and brain tonic, diaphoretic, febrifugal, emetic. Seed-oil—used for treating mental depression, hysteria and for improving memory; also used for scabies, eczema, wounds, rheumatic pains, paralysis. A decoction of seeds is given in gout, rheumatism, paralysis and for treating leprosy and other skin diseases. Leaves—antidysenteric, emmenagogue. Root—a paste of root-bark is applied to swollen veins and pneumonic affections.

Key application ▶ As a tranquilizer (*Indian Herbal Pharmacopoeia*) and brain tonic (*The Ayurvedic Pharmacopoeia of India*). *The Ayurvedic Pharmacopoeia of India* indicated the use of ripe seed in leucoderma and vitiligo.

The seeds are reported to contain the alkaloids, celastrine and paniculatine, which are the active principles of the drug.

In experimental animals, the drug showed lowering of leptazol toxicity, motor activity and amphetamine toxicity, and raising the capacity for learning process. It showed significant CNS depressant effect and a clear synergism

with pentobarbital. The seed extract showed hypolipidaemic effect and prevented atherogenesis in rabbits.

The seed oil showed tranquillizing effect and hastened the process of learning in experimental animals. It produced fall in blood pressure in anaesthetized dog, depressed the heart of frog, and was found to be toxic to rats.

In addition to the seed, 70% alcoholic extract of the plant showed sedative, anti-inflammatory and antipyretic, anti-ulcerogenic effect in experimental animals.

Methanolic extract of flowers showed both analgesic and anti-inflammatory activities experimentally.

Dosage ▶ Ripe seed, devoid of capsule wall—1–2 g; oil—5–15 drops. (*API* Vol. II.)

Celosia argentea Linn.

Family ▶ *Amaranthaceae.*

Habitat ▶ A common weed, occurring throughout India.

English ▶ Wild Cock's Comb.

Ayurvedic ▶ Shitivaaraka, Vitunna.

Siddha/Tamil ▶ Pannaikeerai.

Folk ▶ Shveta-murga, Sarvari, Sarvali, Surali.

Action ▶ Flowers—used in menorrhagia, blood-dysentery. Seeds—antidiarrhoeal, also used in stomatitis. Whole plant—antibacterial, antiscorbutic and cooling.

Tender leaves are rich in potassium and in B1 and B6. An alcoholic extract of the leaves and its flavonoids showed antibacterial activity, which was comparable to ampicillin and streptomycin.

The seeds contain 11.6–17% of protein and 6.4–10.9% of a fatty oil. The seeds and roots yield triterpenoid saponins. An alcoholic extract of the seeds possess significant diuretic activity.

Celosia cristata Linn.

Family ▶ *Amaranthaceae.*

Habitat ▶ Indian gardens, as ornamental.

English ▶ Cock's Comb.

Ayurvedic ▶ Jataadhaari.

Folk ▶ Laal Murgaa.

Action ▶ Seeds—demulcent; used for painful micturition, dysentery. Flowers—used in menorrhagia and diarrhoea.

The plant contains betanin, and several sterols. The inflorescence contain amarantin, isoamarantin, celosianin and isocelosianin. The seeds contain 10.1–12.8% of protein and yield 7.2–7.9% of a fatty oil.

Choline esters of hyaluronic acid from the plant, when fed to rats, showed antiulcer and gastro-protective effect.

Centaurea behen Linn.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Indigenous to Iran. Imported into India.

C

English ► White Rhapontic.

Unani ► Behman Safed, Behman-abyaz.

Action ► Root—nervine and anabolic tonic, strengthens central nervous system; also used in jaundice and affections of the kidney.

The roots contain taraxasterol, its acetate and myristate.

Centella asiatica (Linn.) Urban.

Synonym ► Hydrocotyle asiatica Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► In marshy places throughout India up to 200 m.

English ► Asiatic Pennywort, Indian Pennywort.

Ayurvedic ► Manduukaparni, Manduukaparnikaa, Maanduuki, Saraswati, Brahma-manduuki.

Siddha/Tamil ► Vallaarai.

Action ► Adaptogen, central nervous system relaxant, peripheral vasodilator, sedative, antibiotic, detoxifier, blood-purifier, laxative, diuretic, emmenagogue. Used as a brain tonic for improving memory and for overcoming mental confusion, stress, fatigue, also used for obstinate skin diseases and leprosy.

Key application ► Extracts orally to treat stress-induced stomach and duodenal ulcers; topically to accelerate healing, particularly in cases of chronic postsurgical and post trauma wounds; also to treat second and third degree burns. Patients suffering from venous insufficiency were treated with a titrated extract of the drug. (*WHO.*)
Used in Indian medicine as a brain tonic and sedative. (*Indian Herbal Pharmacopoeia.*)

Major constituents of the plant are: triterpenoid saponins—brahmoside, asiaticoside, thankuniside; alkaloids (hydrocotyline); bitter principles (vellarin).

Brahmoside, present in the plant, is reported to exhibit tranquilizing and anabolic activity. Raw leaves are eaten or plant decoction is drunk to treat hypertension.

Asiaticoside, extracted from leaves, gave encouraging results in leprosy. It dissolves the waxy covering of *Bacillus leprae.* Centelloside has also been found useful in leprosy. Asiaticoside reduced the number tubercular lesions in the liver, lungs, nerve ganglia and spleen in experimental animals. Another derivative of asiaticoside, oxyasiaticoside, inhibits growth of *Tubercle bacillus* at a concentration of 0.15 ml/ml Asiaticosides are also hyperglycaemic.

The asiatic acid acts against resistant bacteria, particularly *Mycobacterium tuberculosis* and *M. leprae* as well as Gram-positive cocci.

Asiaticosides elevate blood glucose, triglycerides and cholesterol levels. They seem to decrease blood urea nitrogen and acid phosphatase levels. (Pharmacological findings. *Natural Medicines Comprehensive Database, 2007.*)

Boiled leaves are eaten for urinary tract infections, and unfiltered juice for scrofula and syphilis.

Extract of the fresh plant significantly inhibits gastric ulceration by cold restraint stress in rats.

In research, using rats, the herb exhibited protective effect against alcohol-induced and aspirin-induced ulcers. (*J Exp Biol*, 2001, Feb, 39(2), 137–42.)

Dosage ► Whole plant—3–6 g (*API* Vol. IV.)

Centipeda orbicularis Lour.

Synonym ► *C. minima* (Linn.) A.Br. & Asch.

Family ► *Compositae; Asteraceae.*

Habitat ► In damp places throughout the plains and low hills in India.

English ► Sneezewort.

Ayurvedic ► Kshavaka, Chhikkini, Chhikkikaa.

Folk ► Nak-chhikani.

Action ► Used for the treatment of rhinitis, sinusitis, nasopharyngeal tumors and obstructions, asthma and cold; also used in hemicrania.

The plant extract showed a good antitussive and expectorant activity on mice. The flavonoids, sesquiterpenes and amide exhibited significant antiallergy activity in passive cutaneous anaphylaxis (PCA) test.

Dosage ► Seed—1–3 g powder. (*CCRAS.*)

Centratherum anthelminticum Kuntze.

Synonym ► *Vernonia anthelmintica* Willd.

Family ► *Asteraceae.*

Habitat ► Throughout India up to 2,000 m in the Himalayas and Khasi Hills.

English ► Purple Flea-bane, Achenes.

Ayurvedic ► Aranya-Jiraka, Vanajiraka, Kaalijiri, Karjiri. Somaraaji (also equated with *Psoralea corylifolia* Linn., *Papilionaceae*).

Unani ► Kamoon barri.

Siddha/Tamil ► Kaattu seerakam.

Action ► Anthelmintic (against earthworms and tapeworms), stomachic, diuretic; used in skin diseases.

Delta-7-avenasterol is the main active principle of seeds. Seed oil contains vernasterol. Seeds bitter principle is a demanolide lactone. Centratherin and germacranolide from the leaves and stem have been isolated. Leaves contain abscisic acid. EtOH extract of achenes exhibited good results in giardiasis. Various plant parts are used in syphilis. Clinical studies on vircarcika eczema validated the use of the drug in skin diseases.

The drug exhibited smooth muscle-relaxant and hypotensive activity in animals.

Dosage ► Seed—1–3 g powder. (CCRAS.)

C

Cephaelis ipecacuanha (Brot.) A. Rich.

Synonym ▶ *Psychotria ipecacuanha* Stokes.

Family ▶ *Rubiaceae.*

Habitat ▶ Native to tropical America. Now cultivated in Darjeeling, Assam, in the Nilgiris, and in Sikkim.

English ▶ Ipecac, Ipecacuanha.

Action ▶ Root—Antiprotozal, expectorant (in low doses), diaphoretic, emetic (in high doses); used in amoebic dysentery, stubborn cough, whopping cough (for liquefying bronchial phlegm).

Key application ▶ As expectorant, emetic. (*The British Herbal Pharmacopoeia.*)

The root contains isoquinoline alkaloids (consisting mainly of emetine and cephaeline); tannins (ipecacuanha and ipecacuanhic acid; glycosides including a monoterpene isoquinoline derivative); saponins; a mixture of glycoproteins; starch; choline; resins.

The alkaloids are clinically useful in the treatment of amoebiasis.

Emetine and cephaeline are emetic due to their irritating effect on stomach; cephaeline is more toxic. Emetine is a standard antiamoebic principle. In smaller doses, both are expectorant.

The fluid extract is 14 times stronger than the syrup of the crude drug. The powder is toxic at 1–2 g.

Emetine accumulates in liver, lungs, kidneys and spleen; traces are detectable after 40–60 days. (Francis Brinker.)

Ceratonia siliqua Linn.

Family ▶ *Caesalpinaceae.*

Habitat ▶ Cultivated in Punjab.

English ▶ Locust Bean; St. John's Bread, Carob tree.

Unani ▶ Kharnub Shaami.

Action ▶ Pod and husk from seed—antidiarrhoeal (stools in gastroenteritis and colitis are known to solidify within 48 h).

The pods contain tannin from 0.88 to 4.09%.

Pulp of the pod contains 30–70% sugars, fats, starch, protein, amino acids, gallic acid; leucoanthocyanins and related phenolics. Leaves contain catechols.

Ceratophyllum demersum Linn.

Family ▶ *Ceratophyllaceae.*

Habitat ▶ All over India from temperate to tropics, in ponds and lakes.

English ▶ Coontail, Hornwort.

Ayurvedic ▶ Shaivaala (also equated with *Vallisneria spiralis* Linn., *Hydrocharitaceae*), Jalnili, Jalaja.

Unani ▶ Tuhlub, Pashm Vazg.

Siddha/Tamil ▶ Velampasi.

Folk ▶ Sevaar.

Action ▶ Purgative, antibilious, antibacterial.

The herb is rich in protein, calcium and magnesium; contains ferredoxin and plastocyanin. EtOH (50%) extract—antimicrobial.

Dosage ► Whole plant—10–20 ml juice; 50–100 ml decoction. (*CCRAS.*)

Cereus grandiflorus Mill.

Family ► *Cactaceae.*

Habitat ► Indian gardens.

English ► Cereus, Night Blooming Cereus, Sweet Scented Cactus.

Folk ► Nivadung Paanchkoni (Maharashtra).

Action ► Fresh, young shoots—cardiac stimulant, anti-inflammatory.

The plant contains glucose, fructose, starch, amino acids and citric, fumaric, maleic, malonic and oxalic acids. Tyramine, a cardiotonic amine, can strengthen heart muscle action.

The flower, stem and young shoots of cereus can stimulate heart and dilate peripheral vessels, as well as stimulate spinal cord motor neurons. The reputed digitalis effect of cereus is claimed to be non-cumulative. (*Natural Medicines Comprehensive Database,* 2007.)

Ceriops candolleana Arn.

Synonym ► *C. tagal* (Perr.) C.B. Robins.

Family ► *Rhizophoraceae.*

Habitat ► Muddy shores and tidal creeks of India.

English ► Compound Cymed Mangrove.

Folk ► Kirrari (Sindh, Maharashtra). Chauri (Maharashtra). Goran (Bengal, Sundarbans).

Siddha/Tamil ► Pandikutti, Pavrikutti, Pavrikutti, Kandal, Chira.

Action ► Plant—astringent. Stem bark—hypoglycaemic. Bark—haemostatic. A decoction is used to stop haemorrhage and is applied to malignant ulcers; also given after child birth.

Shoots—used as a substitute for quinine.

The leaves (dry basis) gave 15.45% tannin, 19.99% non-tannin; twig bark 25.89%, tannin, 9.8% non-tannin; bole bark 41.42% tannin, 10.58% non-tannin.

Presence of sitosterol, cholesterol, campesterol, stigmasterol, 28-isofucosterol and a hydrocarbon, squalene, is reported in the leaves.

Ceropegia bulbosa Roxb.

Family ► *Asclepiadacae.*

Habitat ► Punjab and South India.

Folk ► Khappar-kaddu, Bhuu-tumbi, Paataal-tumbi. Gilothi. Galot (Punjab). Gilodya.

Action ► Tuberous root—used for diarrhoea and dysentery.

The fresh tubers are eaten after removing the bitterness by boiling. The bitter principle is an alkaloid, ceropegine. The tuber contains 42.52% starch and possesses refrigerant property.

C

The aqueous extract of edible Ceropegia sp. contains steriods, polyphenols, sugars and potassium. It potentiated pentobarbitone hypnosis and exhibited analgesic and diuretic activities. It also antagonized histamine-induced asphyxia in guinea pigs.

C. candelabrum L. var. *biflora* (L.) M. Y. Ansari, synonym *C. biflora* L., *C. tuberosa* Roxb., *C. intermedia* auct. non-Wt., are also equated with Bhuutumbi, Paataal-tumbi.

Ceropegia juncea Roxb.

Family ► *Asclepiadaceae.*

Habitat ► Peninsular India.

Folk ► Kanvel (Maharashtra). Bellagada (Telugu, Andhra Pradesh). (Soma is a disputed synonym)

Action ► The plant extract exhibits tranquilizing, hypotensive, hepatoprotective, antiulcer, antipyretic, topically anaesthetic activities in experimental animals.

A pyridine alkaloid, cerpegin, together with a triterpene, lupeol has been isolated from the plant from Tiruneveli, Tamil Nadu.

Cetraria islandica (Linn.) Ach.

Family ► *Parmeliaceae.*

Habitat ► Lichen found in the hills from Tehri Garhwal to East Nepal.

English ► Cetraria, Iceland Lichen, Iceland Moss.

Ayurvedic ► Shaileya (black var.)

Folk ► Charela (black var.)

Action ► A food and tonic in convalescence and exhausting diseases. Used for chronic catarrh and bronchitis.

Key application ► In irritation of the oral and pharyngeal mucous membrane and accompanying dry cough. (*German Commission E, ESCOP.*) As demulcent. (*The British Herbal Pharmacopoeia.*) As a bitter remedy for lack of appetite. (*ESCOP.*)

The moss contains lichen acids (depsidones); mainly cetraric, protocetraric, fumarprotocetraric, lichesteric and usnic acids; polysaccharides about 50%—lichenin 40% and isolichenin 10%; also furan derivatives, fatty acid lactones and terpenes. Lichenin is a moss-starch. Demulcent, expectorant and antiemetic properties are due mainly to the polysaccharides.

The usnic acid and protolichesterinic acid in the lichen and its crude, aqueous extract showed antibacterial activity against several pathogenic bacteria.

Contraindicated in gastric or duodenal ulcers due to its mucosa irritating properties. (Sharon M. Herr.)

Lozenges containing 160 mg of an aqueous extract of Iceland moss, were determined to be positive in 86% cases with good gastric tolerance. (*ESCOP* 1997.)

Cheiranthus cheiri Linn.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Native to South Europe, grown as an ornamental.

English ► Wall-flower, Gilli Flower.

Unani ► Tudri (Surkh, Safed, Zard)

Action ► Flowers—cardioactive, tonic, antispasmodic, purgative, emmenagogue, deobstruent (used in liver diseases and sexual debility). Seeds— stomachic, diuretic, expectorant (in bronchitis and asthma); also goitrogenic. Juice of leaves and seeds—antibacterial.

Flowers contain flavonoids (quercetin and rhamnetin derivatives); seeds contain high levels of cardiac aglycones (30 cardiac glycosides have been isolated); oil contains cherinine, a glucoside of the digitalis group.

In Unani medicine, the drug is used as a tonic to the male reproductive system, but recent findings do not validate its therapeutic use. The flavonoid, kaempferol, isolated from the young plant, inhibits spermatogenesis and alters leydig cell number and diameter, affecting the fertility.

Chenopodium album Linn.

Family ► *Chenopodiaceae.*

Habitat ► A common herb. Its leaves and tender twigs are used as vegetable and fodder.

English ► Fat Hen, Lamb's Quarter, White Goosefoot, Wild Spinach, Pigweed.

Ayurvedic ► Vaastuuka.

Unani ► Bathuaa, Baathu.

Siddha/Tamil ► Paruppukeerai.

Folk ► Bathuaa, Chilli, Chilli-shaak.

Action ► Laxative, anthelmintic against round-and hookworms, blood-purifier, antiscorbutic. An infusion is used for hepatic disorders, spleen enlargement, biliousness, intestinal ulcers. Used for treating burns.

The leaves yield ascaridole, used for treating round-and hookworms. The oil also contain traces of ascaridole. Plant contains 8% saponins. Cryptomeridiol, isolated from the seeds, showed significant growth promoting activity.

Chenopodium ambrosioides Linn.

Family ► *Chenopodiaceae.*

Habitat ► Native to West Indies and South America. Now distributed in South India, Bengal, Kashmir and Maharashtra in wet places with cultivated lands.

English ► Indian Wormseed, Sweet Pigweed, Mexican Tea.

Ayurvedic ► Sugandh-vaastuuka, Kshetra-vaastuuka.

Siddha/Tamil ► Kattasambadam.

Folk ► Khatuaa.

Action ► Antispasmodic, pectoral, haemostatic, emmenagogue. Employed in treating nervous affections, particularly chorea. Dried herb—anthelmintic against round and hookworms.

C

Ascaridole, an active constituent of the oil, is highly active against roundworms, hookworms and small, but not large, tapeworms. It is highly toxic and can cause serious side effects.

The oil has been found useful in amoebic dysentery and intestinal infections (should be used with caution).

Leaves contain kaempferol-7-rhamnoside and ambroside.

A decoction of the herb is given as an internal haemostatic and the infusion as an enema for intestinal ulceration. The infusion is sudorific and diuretic.

The oil exhibits antimicrobial and strong antifungal activity against human pathogenic fungi.

Chenopodium botrys Linn.

Family ► *Chenopodiaceae.*

Habitat ► The Himalaya, from Kashmir to Sikkim.

English ► Feather Geramium, Jerusalem-Oak.

Folk ► Jangaddi (Tibbet). Sahanik, Vaastuuka (Ladakh).

Action ► Stimulant, diuretic, carminative, antispasmodic, emmenagogue, pectoral. Used in asthma, catarrh; diseases of the stomach and liver. Seeds are considered toxic.

The herb contains flavonoids (including chrysoeriol and quercetin), also several sesquiterpenoids. Betaine is found in all parts of the plant.

Fresh herb yields an essential oil; Indian oil is reported to be devoid of ascaridole, the anthelmintic principle.

Chloris gayana Kunth.

Family ► *Poaceae, Gramineae.*

Habitat ► Annual grass introduced into India from South Africa; cultivated in tropical and subtropical low-lying areas where rainfall is less than 125 cm.

English ► Giant Rhodes, Rhodes-Grass.

Folk ► Rhoolsoohullu (Karnataka).

Action ► A proteinaceous factor, phytotrophin, isolated from the grass, was found to have antigenic properties similar to those of animal sex hormones and human chorionic gonadotrophin.

A related species, *Chloris incompleta* Roth., known as Bamnaa in Rajasthan and Mathania in Uttar Pradesh, has been equated with Ayurvedic classical herbs Manthaanak and Trnaaddhip. Another species, *C. virgata* Benth. & Hook. f., known as Gharaniyaa-ghass in Rajasthan, is used for the treatment of colds and rheumatism.

Chlorophytum arundinaceum Baker.

Family ► *Liliaceae.*

Habitat ► The Himalaya from Nepal to Bhutan, Assam and Bihar.

Ayurvedic ► Shveta-Musali. (Considered different from *Asparagus adscendens* Roxb.)

Unani ► Musali Safed, Biskandri.

Siddha/Tamil ► Vallaimusali.

Folk ► Nising, Tibbati Ginseng.

Action ► Tuber—nervine and general tonic. The plant is used as a substitute for onion. Fried powder of the root is chewed in aphthae of mouth and throat. A decoction of the root with turmeric is given in rheumatism.

The roots contain a bibenzyl xyloside, the steroidal sapogenins, besides stigmasterol and its glucoside, nonacosane and tetracosanoic, and triacontanoic acids.

The root extract exhibited good adaptogenic properties. The fruits yield a polysaccharide, galactoglucan.

Chlorophytum tuberosum Baker.

Family ► *Liliaceae.*

Habitat ► Central and Peninsular India up to 1,350 m.

Ayurvedic ► Musali, Mushali.

Unani ► Musali.

Siddha ► Vallaimusali.

Action ► Dried tubers are used as tonic.

The commercial drug, Safed Musali, contains the tubers of *C. arundinaceum* Baker, *C. tuberosum* Baker and *C. indicum* (Willd.) Dress, synonym *C. attenuatum* Baker.

C. indicum is found on the hills in Kerala, Karnataka, Tamil Nadu and on the hills near Udaipur in Rajasthan.

Dosage ► Dried tuber—3–5 g powder. (*CCRAS.*)

Chloroxylon swietenia DC.

Family ► *Rutaceae.*

Habitat ► Dry, deciduous forests, throughout Peninsular India.

English ► Indian Satinwood tree.

Ayurvedic ► Provisionally equated with Bhillotaka.

Siddha/Tamil ► Karumboraju, Kudavuboraju, Poraju.

Folk ► Bhirraa, Bharahula, Raktarohidi.

Action ► Leaves—anti-inflammatory, antiseptic. A paste is applied to wounds; also in rheumatism. Bark—astringent. A decoction is used in contusions and for painful joints. (The wood, its dust, moist dust of freshly cut wood, cause skin irritation and dermatitis.)

The bark contains the alkaloids—skimmianine, swietenidins A and B, chloroxylin and chloroxylonine. Chloroxylonine is a powerful irritant. The bark also contains the coumarins and lignans.

The leaves yield an essential oil which shows antibacterial and antifungal activity.

Chondodendron tomentosum Ruiz et Par.

Family ► *Menispermaceae.*

Habitat ► A native of Peru and Brazil.

English ► False Pareira Brava.

Ayurvedic ► Paatha, Ambashthaa (true Pareira is equated with *Cissampelos* pareira root).

C

Action ► Diuretic (used for chronic inflammation of urinary passages, calculus affections, jaundice, dropsy); also for leucorrhoea, rheumatism.

Roots and stem contain alkaloids, including delta-tubocurarine and *l*-curarine. Tubocurarine is a potent muscle relaxant. The plant contains toxic derivatives and must be used in medicinal doses with caution.

Tubocurarine alkaloid is used as tubocurarine chloride to paralyse body's muscles during operations.

Chonemorpha macrophylla (Roxb.) G. Don.

Synonym ► *C. fragrans* (Moon) Alston.

Family ► *Apocynaceae.*

Habitat ► Dense moist forests throughout India up to 1,500 m altitude.

English ► Wood Vine.

Ayurvedic ► Used in the Southern states as Muurvaa.

Action ► Powdered root and stems—laxative, antibilious.

A lignan derivative has been isolated from the stem. It accelerated uptake of low density lipoprotein by Hep G2 cell by 67.0%.

The root bark contains 3.03% of total alkaloids consisting mainly of chonemorphine. Chonemorphine dihydrochloride is an anti-amoebic principle. It showed *in vitro* activity against *Entamoeba histolytica* and *trichomonas vaginalis*. It proved efficacious against hepatic amoebiasis in golden hamsters and intestinal amoebiasis in Wister rats.

Chrozophora plicata Hook. f.

Synonym ► *C. rottleri* Klotzsh.

Family ► *Euphorbiaceae.*

Habitat ► Throughout India except Jammu & Kashmir and north-eastern India as a weed.

Ayurvedic ► Suuryaavart.

Folk ► Nilakanthi.

Action ► Ash of root—bechic. Leaf—depurative. Seed—cathartic.

Roots contain xanthone glycosides and a chromone glycoside. Seeds gave oil rich in linoleate. The plant contains 9.0% tannin.

Chrysanthemum indicum Linn.

Synonym ► *Pyrethrum indicum* L.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to China and Japan. Cultivated as an ornamental.

English ► Chrysanthemum.

Ayurvedic ► Shatapatri.

Unani ► Guldaaudi.

Siddha/Tamil ► Samanthipoo, Akkarakkaram.

Action ► Flowers—stomachic, aperient, anti-inflammatory. Leaves—prescribed in migraine (as circulatory stimulant). Uses same as those of chamomile.

The flowers contain daucosterol, cumambrin-A, glyceryl-l-monobehenate and palmitic acid. The flowers also contain chrysanthemol which showed strong anti-inflammatory activity in mice. The flavones, apigenin and luteolin, are reported to exhibit marked antitumour activity.

Flowers yield an essential oil containing camphor (16.0%), *trans*-carane-*trans*-2-ol (15.0%), bornyl acetate (12.0%) and sabinene (7%).

A related species *C. parthenium* (Linn.) Berhh., Feverfew, synonym *Tanacetum parthenium,* used for the management of migraine in Western herbal, is found in Jammu and Kashmir. The plant extracts have a powerful and prostaglandin-independent inhibitory effect on the secretion of granule content by leucocytes and platelets. The inhibition of the agonist-induced serotonins release by platelets could be accounted for the benefit in migraine. The compound responsible for the anti-secretory activity has been identified as sesquiterpene alpha-methylene-gamma-lactone derivatives; parthenolide being the main constituent of the lactones. (Two fresh or frozen leaves a day are chewed or capsules or pills containing 86 mg of the leaf material is taken for migraine. Fresh leaves may cause mouth sores.)

Chukrassia tabularis A. Juss.

Family ► *Meliaceae.*

Habitat ► Hills of Sikkim, Maharashtra, Tamil Nadu and the Andamans.

English ► Bastard Cedar, White Cedar, Indian Red Wood.

Siddha/Tamil ► Aglay, Melei Veppu.

Folk ► Chikrassy.

Action ► Bark—astringent, febrifuge, antidiarrhoeic, spasmolytic, diuretic. The plant is used in skeltal fractures.

The bark contains sitosterol, melianone, scopoletin and 6,7-di-MeO-coumarin. The leaves gave quercetin galactoside, galloyl glucocide and tannic acid. The bark and young leaves contain 15 and 20% tannin respectively. Seeds contain tetranortriterpenoids.

EtOH (50%) extract of the stem bark exhibited spasmolytic, hypotensive and diuretic activity. The saline extract of seeds showed haemagglutinating activity.

Cicer arietinum Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Cultivated in most parts of India.

English ► Bengal Gram, Chick pea.

Ayurvedic ► Chanaka, Chanakaa, Harimantha, Vajimantha, Jivan, Sakal-priya.

Unani ► Nakhud.

Siddha/Tamil ► Kadalai, Mookkukkadalai.

Action ► Antibilious, hypocholesteremic, antihyperlipidemic, antistress. Acid exudate from the plant—used in indigestion, diarrhoea, dysentery. Seed coat

extract—diuretic, antifungal (externally). Dry leaf—refrigerant.

Supplementation of gram in wheat based diet helps in lysine absorption which is otherwise a limiting amino acid in cereal based diets. Germination improves mineral bioavailability. In germinated gram flour, there is significant increase in nutritional quality of protein and very significant increase in ascorbic acid.

The seeds contain pangamic acid, the stemina building, antistress and antihyperlipidemic principle of gram. Gram is given as preventive diet to atherosclerosis patients because of its rich phosphorus content.

Isoflavones, biochanin A and formonetin exhibited hypolipidermic activity in rats. Total flavonoids reduced serum and liver cholesterol in rats.

Seeds reduced postprandial plasma glucose in human.

Cichorium endivia Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to the Mediterranean region, cultivated mainly in Northern India.

English ► Succory, Endive.

Unani ► Kaasani, Bustaani (Baaghi).

Action ► Plant—antibilious. Root—demulcent, febrifuge, diuretic; used in dyspepsia; as a tonic for liver and digestive system. Milder than C. *intybus.*

Roots contain sesquiterpene lactones.

See *C. intybus.*

Cichorium intybus Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Europe; commonly occurs in North West India, Tamil Nadu and parts of Andhra Pradesh.

English ► Chicory, Indian Endive.

Ayurvedic ► Kaasani.

Unani ► Kaasani Dashti (Barri).

Siddha/Tamil ► Kasinikkeerai.

Action ► Diuretic, laxative, cholagogue, mild hepatic. Excites peristalsis without affecting the functions of the stomach. Used in liver congestion, jaundice, rheumatic and gouty joints.

Key application (herb and root) ► In loss of appetite, dyspepsia. (*German Commission E.*)

The herb contains inulin (up to 58% in the root); sesquiterpene lactones (including lactucin and lactucopicrin); coumarins (chicoriin, esculetin, esculin, umbelliferone and scopoletin); the root includes a series of glucofructosans. Raw chicory root contains only citric and tartaric acids; roasted chicory contains acetic, lactic, pyruvic, pyromucic, palmitic and tartaric acids. The carcinogenic hydrocarbons and floranthene are also reported in the chicory (a potent carcinogen 3,4-benzpyrene has been detected).

Added to coffee, chicory root counteracts caffeine and helps in digestion.

An alcoholic extract of the plant was found effective against chlorpromazine-induced hepatic damage in adult

albino rats. The cholagogue activity is attributed to polyphenols.

The sedative effect of chicory is attributed to lactucopicrin. The sedative effect antagonizes the stimulant effect of tea and coffee. (*Natural Medicines Comprehensive Database,* 2007.)

The extracts of roots were found to be active against several bacteria.

Dosage ► Seed—3–6 g powder; leaf—10–20 ml juice; root—50–100 ml. (*CCRAS.*)

Cimicifuga racemosa (Linn.) Nutt.

Family ► *Ranunculaceae.*

Habitat ► Temperate Himalayas from Kashmir to Bhutan up to at 3,000–4,000 m.

English ► Black Cohosh Root, Black Snake Root.

Folk ► Cohosh, Jiuenti (Punjab).

Action ► Sedative, anti-inflammatory, antitussive, diuretic, emmenagogue. Used in homoeopathy for rheumatic diseases of nervous, hysterical women, suffering from uterine affections; also for locomotor ataxia.

Key application ► In climacteric (menopausal), neurovegetative ailments, premenstrual discomfort and dysmenorrhoea. (*German Commission E, ESCOP.*)

The rhizome contains triterpene glycosides (including actein, cimigoside, cimifugine and racemoside; isoflaones (including formononetin; isoferulic acid; volatile oil, tannin.

Pharmacological studies have shown that the menthol extract binds to oestrogen receptors *in vitro* and in rat uteri; this activity is thought to be due to the presence of formononetin. Racemoside exhibited antiulcer activity in mice. Isoferulic acid lowered body temperature in rats.

The rhizome is hypotensive in animals; a central nervous system depressant and antispasmodic in mice; causes peripheral vasodilation in human. Also exhibits anti-inflammatory (*The British Herbal Pharmacopoeia*) and hypoglycaemic activity.

Actein has been studied for use in treating peripheral arterial disease. (*Expanded Commission E Monographs.*)

Clinically, the rhizome and root constituents of Black Cohosh does not seem to affect hormonal levels, such as estradiol, LH, FSH and prolactin. (*Natural Medicines Comprehensive Database,* 2007.)

Cimicifuga foetida L. root is used in bronchial and rheumatic diseases. Aqueous EtOH extract is used in cosmetic preparations for protecting skin; also used for preventing oral diseases and bad breath.

White Cohosh, used for urinogenital disorders, is equated with *Actea pachypoda,* synonym *A. alba, A. rubra.* Blue Cohosh has been identified as *Caulophyllum thalictroides.* It is toxic and abortifacient.

Cinchona officinalis Linn.

Synonym ► *C. robusta* How.

C

Family ▶ *Rubiaceae.*

Habitat ▶ Cultivated in West Bengal and Tamil Nadu.

English ▶ Crown or Loxa Bark.

Ayurvedic ▶ Quinine.

Unani ▶ Al-keenaa, Kanakanaa.

Action ▶ Antimalarial, febrifuge, astringent, orexigenic, sapasmolytic. Also prescribed in amoebic dysentery, jaundice, atonic dyspepsia, night cramps. Sometimes causes gastric and intestinal irritation.

Key application ▶ In peptic discomforts such as bloating and fullness, loss of appetite. (*German Commission E.*)

The bark contains alkaloids quinine (2.35–4.42%); quinidine (1.44–2.56%); cinchonine (0.10–0.66%); cinchonidine (0.49–0.89%) and other alkaloids, quinamine, javanine (0.14–0.63%).

The leaves contain quercetin, kaempferol and avicularin.

Quinine is antimalarial; quinidine is antiarrhythmic and cardiac tonic, also used in psychic treatments.

The bark shows potent inhibitory activity against polymorphonuclear leucocytes; the activity is attributed to the alkaloids of the bark. Cinchona may potentiate coumarin derivatives. In large doses, it is sedative to CNS and cardiac plexus.

Quinine is toxic at over 3 g, quinidine at 1 g.

Related Cinchona sp.: *C. calisaya* Wedd. (Nilgiris and Sikkim); *C. calisaya* Wedd. var. *ledgeriana* How. (West Bengal, Khasi Hills and Tamil Nadu); and *C. succirubra* Pav. ex Klotz. (Nilgiris and Annamalis in Tamil Nadu, Sikkim and West Bengal).

The bark of all the species contain quinine, quinidine, cinchonine and cinchonidine and exhibit antimalarial activity. The alcoholic extract of *C. ledgeriana* Moens ex Trimen bark exhibits antibacterial activity against Gram-positive bacteria comparable to sodium penicillin. The extract, however, exhibits lesser activity than dihydrostreptomycin sulphate against Gram-negative bacteria.

Cinnamomum camphora (Linn.) Nees & Eberm.

Family ▶ *Lauraceae.*

Habitat ▶ A tree native to China and Japan and often grown as a hedge plant.

English ▶ Camphor tree.

Ayurvedic ▶ Karpura, Ghanasaara, Chandra, Chandra Prabhaa, Sitaabhra, Hima-valukaa, Himopala, Himakara, Shashi, Indu, Tushaara, Gandhadravya, Shitalraja.

Unani ▶ Kaafoor.

Siddha/Tamil ▶ Indu, Karupporam.

Action ▶ Camphor taken internally in small doses (toxic in large doses) acts as a carminative, reflex expectorant and reflex stimulant of heart and circulation as well as respiration. Also used as a sedative and nervous depressant in convulsions, hysteria, epilepsy, chorea. Topically used as a rubefacient and mild analgesic.

Key application ► Externally in catarrhal diseases of the respiratory tract and muscular rheumatism; internally in hypotonic circulatory regulation disorders, Catarrhal diseases of the respiratory tract. (*German Commission* E.)

The plant contains a volatile oil comprising camphor, safrole, linalool, eugenol and terpeneol. It also contains lignans (including secoisosolariciresinol dimethyl ether and kusunokiol). Safrole is thought to be carcinogenic.

The leaf oil is a natural source of linalool (94.9%); also contained citronellal (2.4%).

Camphor in concentration of 500 mcg/ml completely inhibits the growth of vibro parahaemolyticus, one of the causative agents of diarrhoea and dysentery. Ethanolic extract (50%) of fruits show antibacterial activity against several Gram-positive and Gram-negative bacteria. The essential oil from the plant possesses antifungal activity against many fungi.

Camphor is toxic at 2–20 g.

Dosage ► Concentrate—125–375 mg (*CCRAS.*)

Cinnamomum cassia Blume.

Synonym ► *C. aromaticum* Nees.

Family ► *Lauraceae.*

Habitat ► Native to China, Indonesia and Vietnam.

English ► Chinese Cinnamon, Cassia Bark.

Ayurvedic ► Tvak, Daalchini (bark).

Siddha/Tamil ► Lavangappattai.

Action ► Antispasmodic, carminative, antiputrescent, antidiarrhoeal, antiemetic, antimicrobial, mild analgesic. Used for flatulent dyspepsia, colic, irritable bowel, diverticulosis; also for influenza and colds.

Key application ► In loss of appetite, dyspeptic complaints such as mild spasma of gastrointestinal tract, bloating, flatulence. (*German Commission E, The British Herbal Pharmacopoeia, ESCOP.*)

The bark yields an essential oil containing cinnamaldehyde (82.2%) and eugenol (1.5%) as major constituents.

Cinnamaldehyde is a weak CNS stimulant at low doses and a depressant at high doses and has spasmolytic activity. It is hypotensive, hypoglycaemic and increases peripheral blood flow; it reduces platelet aggregability by inhibiting both cyclooxygenase and lipoxygenase pathways of arachidonic acid metabolism.

Aqueous extract of the bark shows significant antiallergic activity in guinea pig. Diterpenes (Cinncassiols) are thought to be responsible for atleast some of the antiallergic effects.

The herb inhibited ulcers induced by ethanol, also ulcers induced by phenylbutazone; failed to prevent ulcers induced by indomethacin. (*Planta Med* 1989, 55(3), 245–248.)

The extract, when administered orally to rats with nephritis, prevents the increase of protein level in urine.

The bark markedly reduces blood pressure in experimental rats; exhibits tranquilizing effect and is used as

an antiepileptic and sedative agent in drugs of TCM.

C

Cinnamomum tamala.

Family ► *Lauraceae.*

Habitat ► The subtropical Himalayas, Khasi and Jaintia Hills.

English ► Indian Cassia, Lignea.

Ayurvedic ► Tejapatra, Patra, Patraka, Utkat, Tamaalpatra, Naalukaa, Naalikaa.

Unani ► Saleekhaa, Saazaj Hindi (Also equated with Zarnab/Telispattar by *National Formulary of Unani Medicine, Part I.*)

Siddha/Tamil ► Talishpattiri (now equated with the leaf of *Abies webbiana*); Lavangappattiri.

Folk ► Tejpaata.

Action ► Leaf—Carminative, antidiarrhoeal, spasmolytic, antirheumatic, hypoglycaemic. Essential oil—fungicidal.

The oil from bark contains cinnamaldehyde (70–85%) as major constituent. (See.C.cassia.) Leaves from Nepal yield a volatile oil, containing mainly linalool 54.66%; cinnamaldehyde 1.16%, alpha-and beta-pinene, *p*-cymene and limonene.

Cinnamomum wighti Meissn. is also equated with Tejapatra. The bud, known as Sirunaagappoo in Siddha/Tamil, is used as Naagakeshara (black var.). (Naagakeshara is obtained from *Mesua ferra* and *Dillenia pentagyne.*)

C. impressinervium Meissn. (Sikkim) and *C. obtusifolium* (Roxb.) Nees (the Central and Eastern Himalayas up to 2,100 m, Assam and Andaman Islands) are related species of *Cinnamomum.*

The leaves and bark contain cinnamaldehyde.

Dosage ► Dried leaves—1–3 g powder. (*API* Vol. I.)

Cinnamomum zeylanicum.

Synonym ► *C. verum* Persl.

Family ► *Lauraceae.*

Habitat ► Western Ghats at low levels. Plantations of cinnamon are confined to Kerala State.

English ► Cinnamon, Ceylon Cinnamon.

Ayurvedic ► Tvak, Daaruchini, Chochaa, Choncha, Varaanga, Utkata, Daarusitaa (bark).

Unani ► Daarchini (bark).

Siddha/Tamil ► Elavangappattai.

Folk ► Daalchini.

Action ► Bark—carminative, astringent, antispasmodic, expectorant, haemostatic, antiseptic. Leaf—antidiabetic. Ground cinnamon is used in diarrhoea and dysentery; for cramps of the stomach, gastric irritation; for checking nausea and vomiting; used externally in toothache, neuralgia and rheumatism. The bark is included in medicinal preparations for indigestion, flatulence, flu, mothwashes, gargles, herbal teas.

Key application ► As antibacterial and fungistatic. Internally, for loss of appetite, dyspeptic complaints such as mild spastic conditions of the gastrointestinal tract, bloating and flatulence. (*German Commission E, ESCOP.*) Contraindicated in stomach and duodenal ulcers. (*WHO.*)

The Ayurvedic Pharmacopoeia of India indicated the use of dried mature leaves of *Cinnamomum tamala* and dried inner bark of *C. zeylanicum* in sinusitis.

Cinnamaldehyde is the major constituent (74%) of the essential oil from bark.

Major constituent of the leaf oil is eugenol (28–98%) and that of root-bark oil camphor (60%).

Cinnamaldehyde is hypotensive, spasmolytic and increases peripheral blood flow; and it inhibits cyclooxygenase and lipoxygenase enzymes of arachidonic acid metabolism.

Cinnamaldehyde exhibits CNS stimulant effects at high doses. (*Natural Medicines Comprehensive Database,* 2007.)

The bark oil and extracts exhibit antibacterial, antifungal and antiviral activities, and enhance trypsin activity.

Eugenol content of the leaf oil is antiseptic and anaesthetic. It is not interchangable with the bark oil.

Root bark oil acts as a stimulant in amenorrhoea. The bark contains tannins (6.5%) consisting of tetrahydroxyflavandiols; diterpenes, cinnzeylanin and cinnzeylanol.

C. malabatrum (Burm. f.) Blume is equated with Jangali Daarchini.

Dosage ► Dried inner bark—1–3 g powder. (*API* Vol. I.)

C

Cissampelos pareira Linn.

Family ► *Menispermaceae.*

Habitat ► The tropical and subtropical parts of India.

English ► Velvet-Leaf Pareira, Pareira Brava.

Ayurvedic ► Paathaa, Ambashthaa, Varatiktaaa, Vriki, Aviddhakarni, Piluphalaa, Shreyashi.Bigger var., Raaja Paathaa, is equated with *Stephania hernandifolia* Walp.)

Unani ► Paathaa.

Siddha/Tamil ► Paadakkizhangu, Appatta.

Action ► Root astringent, antispasmodic (used for cramps, painful menstruation), analgesic, antipyretic, diuretic, antilithic and emmenagogue. Prescribed for diarrhoea, dysentery, piles, urogenital affections (cystitis, nephritis, menorrhagia) Root paste is applied topically on scabies and eruptions on the body. Also used for preventing miscarriage.

The Ayurvedic Pharmacopoeia of India attributed blood purifying properties to the root and indicated it in lactal disorders.

Hayatine (dl-beberine) is the principal alkaloid of the root. Its derivatives, methiodide and methochloride are reported to be potent neuromuscular-blocking agents.

Not to be confused with *Abuta grandiflora*, a South American medicinal plant.

C

Dosage ▶ Root—3–6 g powder. (*API* Vol. I.)

Cissus quadrangula Linn.

Synonym ▶ *Vitis quadrangula* Wall.

Family ▶ *Vitaceae.*

Habitat ▶ Throughout the warmer parts of India, also cultivated in gardens.

English ▶ Square Stalked Vine, Adamant Creeper.

Ayurvedic ▶ Asthisamhaara, Asthisamhrita. Asthi-samyojaka, Vajravalli, Chaturdhaaraa.

Unani ▶ Hadjod.

Siddha/Tamil ▶ Perandai.

Action ▶ The anabolic and steroidal principles of the aerial part showed a marked influence in the rate of fracture-healing. The drug exerts influence both on the organic and mineral phase of fracture-healing. Stem—alterative in scurvy (the plant is rich in vitamin C) and irregular menstruation.

The plant contains phytogenic steroid, ketosteroids, sitosterol, alpha-amyrin, alpha-ampyrone and tetracyclic triterpenoids. Phytogenic steriods showed bone healing properties. Coloside-A possesses smooth muscle relaxant effect. The total alcoholic extract of the plant neutralizes the anti-anabolic effect of the cortisone in healing of fractures. The aqueous extract of the plant hastens fracture-healing by reducing the total convalescent period by 33% in experimental rats and dogs; it aids in recovery of the strength of the bones up to 90% in 6 weeks.

Dosage ▶ Stem—10–20 ml juice. (*API* Vol. III.)

Citrullus colocynthis Schrad.

Family ▶ *Cucurbitaceae.*

Habitat ▶ Throughout India.

English ▶ Colocynth Bitter Apple.

Ayurvedic ▶ Indravaaruni, Indravalli, Indravaarunikaa, Gavaakshi, Chitraa, Chitraphalaa, Indraasuri, Mrigaani, Mrigairvaaru, Vishaalaa, Vishaalyka, Indraayana. Aindri (also equated with *Bacopa monnieri*).

Unani ▶ Hanzal.

Siddha/Tamil ▶ Kumatti.

Action ▶ Dried pulp of ripe fruit—cathartic, drastic purgative, irritant and toxic. The pulp is used for varicose veins and piles. A paste of root is applied to various inflammations and swellings. The cataplasm of leaves is applied in migraine and neuralgia.

The Ayurvedic Pharmacopoeia of India indicated the use of the fruit in jaundice; the root in diseases of the liver and spleen and the leaf in cutaneous affections and alopecia.

Colocynth contains up to 3% cucurbitacin. The drug and its preparations cause drastic irritation of the gastrointestinal mucosa and haemorrhages.

Cucurbitacins include cucurbitacin E-, J-, L-glucosides. In addition, the pulp contains caffeic acid derivatives (chlorogenic acid).

Roots contain aliphatic compounds. Ethanolic extract (50%) shows significant anti-inflammatory activity in albino rats.

Leaves and flowers contain quercetin and kaempferol. The ethanolic extract of leaves and flowers exhibits antibacterial activity against a number of Gram-positive and Gram-negative bacteria.

The powder is toxic at 0.6–1.0 g. The fruit exhibited carcinogenic activity in animal studies.

Dosage ▶ Dried fruit—125–500 mg powder. (*API* Vol. III.) Root—1–3 g. powder. (*CCRAS.*) Dried leaf—for external use. (*API* Vol. II.)

Citrullus vulgaris Schrad.

Synonym ▶ *C. lanatus* (Thunb.) Matsumura & Nakai.

Family ▶ *Cucurbitaceae.*

Habitat ▶ Cultivated throughout India on sandy river beds, up to an altitude of 1,500 m.

English ▶ Watermelon.

Ayurvedic ▶ Kalinga.

Unani ▶ Tarbuz.

Siddha ▶ Poiychaviral, Tharbuzapalam (Tamil.

Action ▶ Pulp—cooling and refreshing, a rich source of pectin, carotenoids, surcose (as major sugar). Fruit juice is prescribed in strangury and urinary complaints, also in hepatic congestion and intestinal catarrh. Seeds—cooling, purgative, diuretic, demulcent (used in urinary infections). Leaves—febrifuge. The pericarp is given in diarrhoea.

Watermelon juice contains citrullin (0.17%) and arginine, which are thought to increase urea production in the liver, thus increasing the flow of urine.

The seeds possess a high lipase activity comparable to that of wheat germ, in addition to high lipoxygenase, urease and trypsin-inhibitor activities. Aqueous extract of the seeds also exhibit amylase inhibitor activity. The seed oil is used as a substitute for almond oil.

The roots of mature plant contain a triterpene, bryonolic acid. Bryonolic acid possesses a stronger antiallergic activity with lesser side effects than that of glycyrrhetinic acid, the aglycone of glycyrrhizin, used clinically in Japan for the treatment of allergy and hepatitis.

Citrus aurantifolia (Christm.) Swingle.

Synonym ▶ *C. medica* L. var. *acida* (Roxb.) Hook. f.

Family ▶ *Rutaceae.*

Habitat ▶ Wild in the warm valleys of the outer Himalayas. Cultivated in the plains.

English ▶ Acid or Sour Lime, Country Lime.

Ayurvedic ▶ Nimbuka.

C

Unani ► Limu Kaghzi.

Siddha/Tamil ► Elummichhai, Thurinjippazham.

Folk ► Kaagazi Nimbu.

Action ► Antiscorbutic, stomachic, appetizer, refrigerant. Used in bilious vomiting. Leaves—an infusion is given for fever in jaundice, for sore throat, thrush. Root—an infusion is given for colic and dysentery, also as febrifuge.

Limes are rich in vitamins, minerals and alkaline salts, but not in fruit sugars. Lime peel contains ergosterol. An enzyme, 1,3-beta-glucan hydrolase has been reported from the bark and leaf extract. See *C. limon*.

Citrus aurantium Linn.

Family ► *Rutaceae.*

Habitat ► Cultivated in Khasi hills and Cachar. Also in Guntur (Andhra Pradesh). Found in semi-wild state in the Naga and Khasi hills.

English ► Citrus dulcis, Sour Orange, Sweet Orange.

Folk ► Khattaa.

Siddha/Tamil ► Mallikanarangi.

Action ► Peel—laxative, feeble stomachic, emmenagogue. Leaves—prescribed in the treatment of arthritis and bronchitis. Flowers—aqueous extract is employed in scurvy, fever, inflammation, nervous and hysterical cases. Fruit—a decoction is used to recover from cachexia left by intermittent fever and in cases of enlarged spleen. Dried rind—used in atonic dyspepsia.

Key application ► Cut peel—in loss of appetite and dyspeptic ailments. (*German Commission E.*). As a bitter tonic. (*British Pharmacopoeia.*)

The main constituents of the peel include the alkaloid synephrine and N-methyltyramine. Synephrine, an alpha 1-adrenergic agonist, stimulates a rise in blood pressure through vasoconstriction. N-methyltyramine also raises blood pressure.

The root gave xanthyletin.

The essential oil exhibits antifungal activity, it was found effective in treatment-resistant fungal skin diseases. (*Expanded Commission E Monographs.*)

Commercially available Citrus vulgaris (bitter orange) extracts are often promoted for weight loss due to purported thermogenic effects. In animal models, synephrine causes weight loss, but also increases cardiovascular toxicity. (*Natural Medicines Comprehensive Database,* 2007.)

Citrus limon (Linn.) Burm.f.

Family ► *Rutaceae.*

Habitat ► Cultivated all over India.

English ► Lemon.

Ayurvedic ► Jambira, Jambh, Jambhir, Jaamphal, Nimbu, Nimbuka, Naaranga, Limpaka, Dantashatha, Airaavata, Neebu (bigger var.).

Unani ► Utraj.

Siddha/Tamil ► Periya elumuchhai.

Action ► Fruit—antiscorbutic, carminative, stomachic, antihistaminic, antibacterial. Used during coughs, colds, influenza and onset of fever (juice of roasted lemon), hiccoughs, biliousness. Fruit juice—used externally for ringworm (mixed with salt), erysipelas, also in the treatment of leprosy and white spots. Leaves and stems—antibacterial.

All parts of the plants of *citrus* sp. contain coumarins and psoralins. The fruits contain flavonoids and limonoids. The flavonoids comprise three main groups—flavanones, flavones and 3-hydroxyflavylium (anthocyanins); flavanones being predominantly followed by flavones and anthocyanins. Bitter flavonoids do not occur in lemon and lime.

Lemon juice is a richer source of antiscorbutic vitamin (contains 40–50 mg/100 g of vitamin C) than lime, and a fair source of carotene and vitamin B1. Volatile oil (about 2.5% of the peel) consists of about 75% limonene, alpha-and beta-pinenes, alpha-terpinene and citral. The fruit juice also contains coumarins and bioflavonoids.

The acid content of the fruit, once digested, provides an alkaline effect within the body and is found useful in conditions where acidity is a contributory factor (as in case of rheumatic conditions). The bioflavonoids strengthen the inner lining of blood vessels, especially veins and capillaries, and help counter varicose veins, arteriosclerosis, circulatory disorders and infections of liver, stomach and intestines.

Major flavonoid glycosides, isolated from citrus peels and juices, include hesperidin (with properties of vitamin P). Rutin and other flavanones, isolated from citrus fruits, form the principal components of vitamin P. Flavanone glycosides contained in lemon and lime juices are eriocitrin 47 and 94; hesperidin 84 and 196 mg/l, respectively.

The composition of cold pressed lime oil is quite similar to lemon oil, but citral content of lime oil is higher.

Monoterpene alcohols and their esters, aldehydes—geraniol, geranial and neral, contribute to the characteristic aroma of lemon and lime.

Dosage ► Fruit—6–12 g (Juice—5–10 ml). (*API* Vol. IV.)

Citrus maxima (Burm.) Merrill.

Synonym ► *C. decumana* Watt. *C. grandis* (L.) Osbeck.

Family ► *Rutaceae.*

Habitat ► North-eastern region up to 1,500 m in Assam and Tripura.

English ► Pummelo, Shaddock.

Ayurvedic ► Madhukarkatikaa.

Unani ► Chakotra.

Siddha/Tamil ► Pambalimasu.

Folk ► Mahaa-nibu, Sadaaphal.

Action ► Fruit—cardiotonic. Leaves, flowers and rind—used as a sedative in nervous affections. Leaves—used in convulsive cough, chorea, epilepsy, also in the treatment of haemorrhagic diseases. A lotion of boiled leaves used hot in painful swellings. The essential oil from

fresh leaves exhibits dermatophytic, and fungistatic activity.

The root-bark contains beta-sitosterol and acridone alkaloids. It also contains several coumarins. The alkaloids and coumarins show antimicrobial acitivity.

The essential oil from the leaves and unripe fruits contain 20% limonin, 30% nerolol, 40% nerolyl acetate and 3% geraniol.

Citrus medica Linn.

Family ► *Rutaceae.*

Habitat ► Khasi Hills, submountainous Himalayan ranges in Garhwal, Kumaon in U.P., Maland areas of South, Pachmarhi (Madhya Pradesh), Sikkim and Western Ghats.

English ► Citron.

Ayurvedic ► Maatulunga, Lunga, Maatulaka, Mahaalunga, Bijpuura, Bijaahva.

Unani ► Turanj.

Siddha/Tamil ► Kadaranrathai, Naarthankai, Thurinjippazham.

Folk ► Bijoraa.

Action ► Fruit—antiscorbutic, refrigerant, astringent, carminative, stomachic, antibacterial. Used for dyspepsia, bilious vomiting, cold, fever, hiccough. Root—anthelmintic. Flowers and buds—astringent.

The peel contains coumarins, limettin, scoparone, scopoletin and umbelliferon; besides nobiletin, limonin, diosmin, beta-sitosterol and beta-D-glucoside. The roots contain campesterol, stigmasterol, sitosterol and cholesterol.

Aqueous extract of the peel showed hypotensive action in dogs.

The fruits and seeds are a cardiotonic; found useful in palpitation.

Dosage ► Fruit—10–20 ml juice. (*API* Vol. III.) Leaf, flower, fruit, root—50–100 ml decoction. (*CCRAS.*)

Citrus paradisi Macf.

Family ► *Rutaceae.*

Habitat ► Native to the West Indies. Commercialized in the USA. Cultivated mainly in Punjab.

English ► Grapefruit, 'Marsh' Grapefruit.

Folk ► Chakotraa. Chima Bombilimaas (Tamil Nadu).

Action ► Young leaves—decoction is used to relieve cold or headache. Fruit—used for developing resistance against colds and influenza.

Grapefruit is rich in vitamins, minerals, potassium and pectin, which balance the acid reaction in the stomach and stimulate appetite. Half grapefruit contains vitamin A 318 IU, vitamin C 46.8 mg, niacin 0.2 mg, potassium 158 mg. The fruit contains beta-carotene and cartenoid lycopene. Lycopene is especially noted for reducing the risk of prostate cancer. The fruit juice contains furanocoumarins, including bergamottin, also naringin, naringenin, limonin, quercetin, kaempferol and obacunone.

For drug interactions with grapefruit juice, see *Natural Medicines Comprehensive Database*, 2007.

Grapefruit is not to be confused with grape (*Vitis vinifera*).

Clausena pentaphylla (Roxb.) DC.

Family ▶ *Rutaceae.*

Habitat ▶ The sub-Himalayan tract from Garhwal to Sikkim; also in Chakrata range.

Folk ▶ Ratanjot (var.), Rowana. Surasi is a doubtful synonym.

Action ▶ Bark—anti-inflammatory, spasmolytic; used in veterinary medicine for wounds and sprains.

Aerial parts contain coumarins—clausmarins A and B. Coumarins exhibit spasmolytic activity. The root also contains coumarins. Root and stem bark of *Clausena excavata* Burm. f. Eastern sub-Himalayan tract, Orissa and Bihar) also contain coumarins—clausenin and clausenidin. The root bark exhibits antibacterial activity against both Gram-positive and Gram-negative bacteria.

A related species, *C. anisata* (Willd.) Oliver, is reported from Uttar Pradesh. Ethanolic extract of the aerial parts exhibited spasmolytic activity. The furanocoumarins, anisolactone, xanthotoxol, indicolactone, imperatorin and 2′, 3′-epoxy-anisolactone have been isolated from the extract.

In West African traditional medicine, the decoction of the root is given to control convulsions in children. The anticonvulsant agent has been found to be heliettin, extracted from the stem bark and roots.

Claviceps purpurea (Fr.) Tul.

Family ▶ *Hypocreaceae.*

Habitat ▶ A fungous parasite on a number of grasses particularly in rye, cultivated in the Nilgiris and at Chakrohi farm in Jammu.

English ▶ Ergot of Rye. Fungus of Rye.

Ayurvedic ▶ Annamaya, Sraavikaa.

Unani ▶ Argot.

Siddha/Tamil ▶ Ergot.

Action ▶ Uterine stimulant. Oxytocic, abortifacient, parturient, vasoconstrictor, haemostatic. Used in obstetrics (difficult childbirth, for exciting uterine contractions in the final stages of parturition). Also used after abortion for removal of the placenta. It is no more employed in internal haemorrhages, as it has been found to raise blood pressure in pulmonary and cerebral haemorrhage. Included among unapproved herbs by *German Commission E.*

The fungus gave indole alkaloids. The ergometrine or ergonovine group includes ergometrine and ergometrinine. The ergotamine group includes ergotamine and ergotaminine. The ergotoxine group includes ergocristine, ergocristinine, ergocryptine, ergocryptinine, ergocornine and ergocorninine. The fungus also contains histamine, tyramine and other amines, sterols and acetylcholine.

C

The alkaloids of ergot are being used independently (not as a herbal medicine). Ergotamine is used to relieve migrainous headaches as it is a vasoconstrictor and has antiserotonin activity. Ergometrine is used after childbirth in the third stage of labour and for post-partum haemorrhage, as it is a powerful uterine stimulant, particularly of the puerperal uterus. (Both the constituents are used under medical supervision). Ergocornine significantly inhibited the development of induced mammary tumours in rats. The derivatives of ergot alkaloids are known to have suppressing effect on human breast cancer in initial stages. This activity is linked to prolactin inhibitory action.

The extract is toxic at 1.0–3.9 g, ergot alkaloids at 1 g in adults, 12 mg in infants. (Francis Brinker).

Dosage ► Whole plant—10–30 ml infusion. (*CCRAS.*)

Clematis gouriana Roxb.

Family ► *Ranunculaceae.*

Habitat ► Throughout India in plains.

English ► Commercially known as Muurvaa.

Folk ► Belkangu (used as substitute for Muurvaa in Maharashtra).

Action ► Leaf and stem—vesicant, poisonous.

Aerial parts and roots contain a quaternary aporphine alkaloid, magnoflurine. The leaves yield protoanemonin, a fungitoxic compound.

A related species, *C. napaulensis* DC. is used in leprosy. *C. recta* (Upright Virgin's Bower) is used in homoeopathic medicine for cancerous and foul ulcers; orally for rheumatic pains, varicose veins, gout and as a diuretic.

Cleome brachycarpa Vahl ex DC.

Synonym ► *C. vahliana* Farsen.

Family ► *Capparidaceae.*

Habitat ► Northwestern Rajasthan, Punjab plains and Delhi.

Unani ► Panwaar.

Folk ► Madhio (Rajasthan).

Action ► Anti-inflammatory, antirheumatic, antidermatosis (used in scabies, also in leucoderma).

The plant contains trinortriterpenoids and cabralealactone, besides ursolic acid.

Cleome icosandra Linn.

Synonym ► *C. viscosa* Linn.

Family ► *Capparidaceae.*

Habitat ► Throughout India; Tripura, West Bengal and Gangetic valley, as a weed.

English ► Wild Mustard.

Ayurvedic ► Tilaparni, Hurhur (yellow var.), Aadityabhakta.

Unani ► Panwaar, Hulhul.

Siddha/Tamil ► Nayikkadugu, Nalvellai.

Action ► Seed—carminative, antiseptic, anthelmintic (for round worms). Leaf—sudorific. Bark—externally rubefacient, vesicant. Root—vermifuge.

The aerial parts contain a macrocyclic diterpene, cleomaldeic acid, and a bicyclic diterpene, cleomeolide. The seeds contain coumarino-lignans, cleomiscosin A,B,C and D. The leaf extract exhibited fungitoxicity against ringworm causing fungi with reported mycelian inhibitions.

The aqueous extract of seeds exhibited significant analgesic and local anaesthetic activities in mice and guinea pigs, respectively. It failed to protect rats against convulsions induced by picrotoxin, though it potentiated the barbiturate sleeping time.

The purple var. of Hurhur is equated with *Cleome monophylla* L. (Bihar, Orissa, Andhra Pradesh and Tamil Nadu).

Clerodendrum indicum
(Linn.) Kuntze.

Synonym ► *Clerodendron siphonanthus* (R. Br.) C. B. Clarke.

Family ► *Verbenaceae.*

Habitat ► Cultivated as an ornamental throughout India, especially in South and Eastern India.

English ► Turk's Turban, Tube-Flower.

Ayurvedic ► Vaamana-haati (a substitute for Bhaarangi).

Siddha/Tamil ► Kavalai, Narivalai.

Action ► Root—used for asthma, cough, scrofulous affections. Leaf—vermifuge. Resin—antirheumatic. The plant is also used in fever, atrophy, emaciation of cachexia and consumption.

The leaves contain flavonoids—scutellarein (0.5%), hispidulin (0.1%) and their 7-O-glucuronides; also sterols. Flowers contain beta-sitosterol and triterpenoids. The bark yields hexitol and sorbitol.

The flavone, pectolinarin and a diterpene, oncinotine, exhibit antifeedant activity.

Clerodendrum inerme
(L.) Gaertn.

Family ► *Verbenaceae.*

Habitat ► Throughout India in tidal forests, wild all over coastal areas; planted in gardens in Tamil Nadu.

English ► Smooth Volkameria.

Ayurvedic ► Putigandhaa, Kundali, Vanajai.

Siddha/Tamil ► Peenaari, Sangankuppi.

Folk ► Lanjai.

Action ► Leaf—febrifuge, alterative. Used as a substitute for *Swertia chirayita* and quinine in remittent and intermittent fevers. The leaf juice is taken orally to relieve muscular pains and stiffness of legs (in tetanus).

The leaves and stem contain a number of triterpenes, neolignans, diterpenoids, sterols and flavones.

C

The roots are prescribed in venereal diseases. The methanolic extract of the roots contains verbascoside which exhibits analgesic and antimicrobial properties.

Clerodendrum infortunatum
auct. non Linn. C.B.Clarke.

Family ► *Verbenaceae.*

Habitat ► Throughout India.

Ayurvedic ► Bhaandira, Bhaandi, Kaari. Also known as Bhaarangi (*C. serratum*).

Siddha/Tamil ► Karukanni, Perugilai.

Action ► Leaves—used as a substitute for Chiretta. Leaves and roots—employed externally for skin diseases and alopecia. Leaves are prescribed in headache. Roots are given in cramps and rheumatism.

In homoeopathy, the fresh leaves are employed for colic due to worms, diarrhoea associated with nausea, chronic fever with loss of appetite and in enlargement of liver and spleen with indigestion and constipation.

The alcoholic extract of the whole plant showed antiprotozoal activity against *Entamoeba histolytica*. It also exhibited hypoglycaemic activity in albino rats. The leaves exhibit antifungal activity.

Dosage ► Leaf—10–20 ml juice. (*CCRAS.*)

Clerodendrum phlomidis
Linn.f.

Synonym ► C. multiflorum (Burm. f.) O. Kuntze.

Family ► *Verbenaceae.*

Habitat ► Throughout India, in the drier parts.

Ayurvedic ► Agnimantha, Tarkaari, Vikraantaa, Jayanti, Jai, Jayaa, Ganikaarikaa, Vaijayanti, Bigger var. is equated with *Premna integrifolia* Linn., Shriparni, Naadeyi.

Siddha/Tamil ► Tazhuthaazhai.

Folk ► Laghu Arni.

Action ► Plant parts used in dyspepsia, stomachache, colic, cholera, dysentery, postnatal fever, during convalscence from measles. Root and bark—bitter tonic, used in debility and nervous disorders.

The Ayurvedic Pharmacopoeia of India indicated the use of root in dysuria and retention of urine.

Flavonoids, scutellarein and pectolinarin, have been isolated from the leaves. Stems gave *d*-mannitol, beta-sitosterol, its glucosides and ceryl alcohol. The roots contain ceryl alcohol, clerodin, clerosterol and clerodendrin A.

The ethanolic extract of leaves exhibited hepatoprotective activity. The aqueous extract of leaves exhibited *in vitro* anthelmintic activity. The plant also exhibited antidiabetic activity.

Dosage ► Root—12–24 g for decoction. (*API* Vol. III.)

Clerodendrum serratum
(Linn.) Moon.

Family ► *Verbenaceae.*

Habitat ▶ A shrub distributed throughout the country, especially common in Assam and Bengal.

English ▶ Blue-flowered Glory tree, Beetle Killer.

Ayurvedic ▶ Bhaargi, Bhaarangi, Angaarvalli, Phanji, Braahmanyashtikaa, Kharshaak, Padma, Bhragubhavaa, Brahmayashtikaa.

Siddha/Tamil ▶ Kandoorbarangi (root), cherutekku.

Action ▶ Root—Antiasthmatic, antihistaminic, antispasmodic, antitussive carminative, febrifuge. Leaf—febrifuge.

The Ayurvedic Pharmacopoeia of India indicated the use of the dried roots in cough, bronchitis, dyspnoea, chest diseases and sinusitis.

The bark contains triterpenoids—serratagenic, oleanolic and queretaric acids; leaves contain alpha-spinasterol and flavonoids, including luteolin, apigenin, baicalein, scutellarein, phenolic acids—caffeic and ferulic acids.

EtOH (50%) extract of the plant exhibited hypotensive and spasmolytic activity. Polyhydric property on isolated guinea pig ileum. Antiasthmatic effect was also observed pharmacologically.

Dosage ▶ Root—3–6 g powder; 10–20 g for decoction. (*API* Vol. III.)

Clitoria ternatea Linn.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Throughout India in tropical areas; also cultivated in hedges.

English ▶ Butterfly Pea, Winged-leaved Clitoria, Mezereon.

Ayurvedic ▶ Girikarnikaa, Aparaajitaa, Aasphota, Girimallikaa, Girikanyaa, Kokilaa,Yonipushpaa, Vishnukraantaa. (*Evolvulus alsinoides* Linn. is also known as Vishnukraantaa, Vishnukranti). Used as Shankhapushpi in the South.

Unani ▶ Mezereon Hindi.

Siddha/Tamil ▶ Kakkanam.

Folk ▶ Koyal (Punjab).

Action ▶ Root—cathartic like jalap. Roots cause gripe and tenesmus, hence not recommended as purgative. Used in ascites. Root bark—diuretic (infusion used in irritation of bladder and urethra). Root juice—given in cold milk to liquefy phlegm in chronic bronchitis. The root, bark, seeds and leaves—used for gastric acidity. The root is administered with honey as a general tonic to children for improving mental faculty.

The Ayurvedic Pharmacopoeia of India recommends the dried leaf in migraine, psychoneurosis and mania.

An alcoholic extract of the plant showed sedative and hypothermic effect in rodents.

Rats, fed with ethanol extract of flowers, showed a significantly lowered serum sugar level in experimentally induced diabetes.

The seeds contain a nucleoprotein with its amino acid sequence similar to insulin, but for the absence of histidine, threonine, proline and crystine.

Seeds gave cinnamic acid, flavonol glycoside. Leaves contain glycosides of kaempferol.

In South India, the seeds and roots constitute the drug Shankhapushpi, used as a nervine tonic. In other regions, *Canscora decussata, Convolvulus pluricaulis, Evolvulus alsinoides* and *Lavendula bipinnata* are used as Shankhapushpi.

Dosage ▶ Root—1–3 g powder (*API* Vol. II); dried leaf—2–5 g; seed—1–3 g. (*API* Vol. IV.)

Coccinia indica W. & A.

Synonym ▶ *C. cordifolia* Cogn. *Cephalandra indica* Naud.

Family ▶ *Cucurbitaceae.*

Habitat ▶ Cultivated in Assam, West Bengal, Bihar, Orissa, Maharashtra, Andhra Pradesh, Tamil Nadu; wild in many parts of India.

English ▶ Ivy-Gourd.

Ayurvedic ▶ Bimbi, Tundi, Tundikaa, Tundikeri, Kunduru, Raktaphala, Piluparni, Dantchhadaa.

Unani ▶ Kanduri.

Siddha/Tamil ▶ Kovvai.

Action ▶ Carminative, antipyretic, galactagogue. Powder of root is taken with water to stop vomiting. Juice of leaves—antispasmodic and expectorant. Applied externally in eruptions of the skin. Root—antiprotozoal. Fruit, leaf and root—antidiabetic. Various plant parts are used in slow pulse and convulsions, also against infective hepatitis.

The Ayurvedic Pharmacopoeia of India recommends the whole plant for oedema, anaemia, disorders due to vitiated blood, cough and dyspnoea.

The fruit yielded beta-amyrin and its acetate, lupeol and cucurbitacin B.

Dosage ▶ Whole plant—3–6 g powder; 5–10 ml juice. (*API* Vol. III.)

Cocculus hirsutus (Linn.) Diels.

Synonym ▶ *C. villosus* (Lam.) DC.

Family ▶ *Menispermaceae.*

Habitat ▶ Throughout tropical and sub-tropical tracts of India.

English ▶ Broom-Creeper, Ink-Berry.

Ayurvedic ▶ Chhilihinta, Paataala-garuda, Mahaamuulaa, Dirghavalli, Jalajamani.

Siddha/Tamil ▶ Kattukodi.

Action ▶ Root—laxative, sudorific, alterative, antirheumatic. Leaf—used externally for eczema, prurigo and inpetigo. A decoction of leaves is taken in eczema, leucorrhoea and gonorrhoea.

Aqueous extract of stem and root—sedative, anticonvulsant, hypotensive, bradycardiac, cardiotonic and sapasmolytic. Roots are used as a substitute for Sarsaparilla in chronic rheumatism gout, and syphilitic cachexia.

The stem contains cyclopeptide alkaloids. The plant contains coclaurine, magnoflorine, beta-sitosterol, ginnol and a monomethyl ether of inositol.

C. pendulus (Forsk.) Diels, synonym *C. leaeba* (Del.) DC. (Punjab, Gujarat

and South India) is known as Parwati (Gujarat, Sindh) and Ullar-billar (Punjab).

Ethanolic extract of the leaves and stem showed anticancer and hypotensive activities associated with the alkaloidal fraction which contains bisbenzylisoquinoline alkaloids (including pendulin and cocsulin). Presence of quercitol is reported from non-alkaloidal fraction.

Dosage ► Root—50–100 ml decoction. (*CCRAS.*)

Cochlearia armoracia Linn.

Synonym ► *Armoracia rusticana* Gilib.

Family ► *Cruciferae, Brassicaceae.*

Habitat ► Eastern Europe; cultivated in Britain and the USA. Grown to a small extent in North India and hill stations of South India.

English ► Horseradish.

Action ► Root—used for catarrhs of the respiratory tract. Antimicrobial and hyperemic.

The root contains glucosinolates, mainly sinigrin, which releases allylisothiocyanate on contact with the enzyme myrosin during crushing and 2-phenylethylglucosinolate. Crushed horseradish has an inhibitory effect on the growth of micro-organisms.

Fresh root contains vitamin C on an average 302 mg% of ascorbic acid.

A related species, *C. cochlearioides* (Roth) Sant & Mahesh, synonym *C. flava* Buch.-Ham. ex Roxb. (upper and lower Gangetic valleys), is used for fevers.

C

Cochlospermum gossypium DC.

Synonym ► *C. religiosum* (Linn.) Alston.

Family ► *Cochlospermaceae.*

Habitat ► Andhra Pradesh, Karnataka, Tamil Nadu, Madhya Pradesh and Bihar; cultivated at Agartala in Tripura.

English ► Golden Silk tree, White Silk Cotton tree.

Unani ► Samagh, Kateeraa (substitute for gum tragacanth).

Siddha/Tamil ► Kongilam (flower juice), Tanaku.

Action ► Gum—cooling, sedative, bechic, useful in coughs, hoarse throat, diarrhoea, dysentery, scalding urine. Dried leaves and flowers—stimulant.

The leaves contain terpenoids, saponins and tannins. Flowers contain naringenin and beta-sitosteryl-glucoside (0.3%). The gum, after hydrolysis, furnished a mixture of acidic oligosaccharides.

Cocos nucifera Linn.

Family ► *Palmae; Arecaceae.*

Habitat ► Cultivated chiefly in Kerala, Tamil Nadu and Karnataka.

English ► Coconut Palm.

C

Ayurvedic ► Naarikela, Naalikera, Laangali, Tunga, Skandhaphala, Sadaaphala, Trnaraaja, Kuurchshirshaka.

Unani ► Naarjeel, Naariyal.

Siddha/Tamil ► Thenkai. Kopparai (kernel of ripe coconut).

Action ► Water from tender fruit—cooling, used in thirst, fever, urinary disorders, gastroenteritis, and as a source of K for cholera patients. Fruit—stomachic, laxative, diuretic, styptic, sedative; useful in dyspepsia and burning sensation. Oil from endosperm—antiseptic; used in alopecia. Root—astringent; used in urinary and uterine and disorders.

Tender coconut water is rich in potassium and other minerals and vitamins. It contains reducing sugars 2.22–2.85%, total sugars 3.5–4.25%; brix 5.5–6.2%. It is used as a substitute for normal saline in cases of dehydration.

Alcoholic extract of coconut shell (2% in petroleum jelly, externally) was found very effective in dermatophytosis. Lighter fractions of the tar oil are used as antiseptics.

Flowers, mixed with oil, are applied to swellings, leaves to treat abscesses, shoots and ashes of dry meat to deep cuts, grated meat to burns, roots to wounds and gonorrhoea.

Shell and fibre—antimicrobial.

Dosage ► Dried endosperm—10–20 g powder. (*API* Vol. III.)

Coffea arabica Linn.

Family ► *Rubiaceae.*

Habitat ► Grown in Tamil Nadu, Karnataka and Kerala.

English ► Arabian coffee.

Unani ► Kahvaa.

Siddha/Tamil ► Kaapi, Bannu.

Action ► Diuretic, antinarcotic, psychotropic agent, direct heart stimulant (raises blood pressure). Neutralizes therapeutic effects of many herbs; potentiates the action of aspirin and paracetamol; depletes the body of B-vitamins. Charcoal of the outer seed parts—astringent, absorbent.

Key application ► Powdered coffee charcoal—in nonspecific, acute diarrhoea; local therapy of mild inflammation of oral and pharyngeal mucosa (average daily dose 9 g). (*German Commission E.*)

According to *WHO,* coffee drinking is not responsible for breast cancer and may protect against cancer of colon and rectum. Caffeic and chlorogenic acids in coffee act as anticarcinogens.

Bronchial asthma is less frequent among coffee drinkers due to caffeine and theophylline.

The aroma components include several furfuryl methyl mercaptan derivatives. Coffee extracts yielded organic acids. Atractyloside, several sterols and acids, as well as alkaloids, have been reported. Caffeine is the major alkaloid of coffee. One cup of coffee contains approx. 60–120 mg caffeine; other active constituents include chlorogenic acid, caffeol and diterpenes.

Chlorogenic acid in coffee might inhibit glucose-6-phosphatase, which

might lower hepatic glucose production caffeine seems to stimulate pancreatic beta cells to secrete insulin. (*Natural Medicines Comprehensive Database,* 2007.)

Coix lacryma-jobi Linn.

Synonym ► *C. lachryma* Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Warm and damp areas up to about 2,000 m, both wild and cultivated as an annual grass.

English ► Job's Tears.

Ayurvedic ► Gavedhukaa.

Siddha/Tamil ► Kaatu Kunthumani.

Folk ► Garaheduaa, Gargari.

Action ► Fruits—a decoction is used for catarrhal affections of the air passage and inflammation of the urinary tract. Seed—diuretic. Root—used in menstrual disorders. Leaves—used as a drink for inducing fertility in women.

The seeds contain *trans*-ferulyl stigmastanol and *trans*-ferulyl campestanol, which form part of an ovulation-inducing drug. Seed extract—immuno-enhancer, used for the prevention of cancer and infections. Seeds exhibit anti-tumour and anticomplimentary activities. Seeds contain coixenolides, a mixed ester of palmitoleic and vaccenic acids, which is an anticancer agent.

The bigger var. of the grass is equated with *Coix gigantea* Koenig ex Roxb., also known as Gavedhukaa and Gargari.

Colchicum luteum Baker.

Family ► *Liliaceae.*

Habitat ► The temperate Himalayas from Kashmir to Chamba. Major supplies of the drug are received from Kashmir.

English ► Hermodactyls, Colchicum, Meadow Saffron, Golden Collyrium (Indian substitute). (*C. luteum* is a good substitute for *C. autumnale* L. which is official in the B.P.)

Ayurvedic ► Hiranyatuttha.

Unani ► Suranjaan Talkh.

Action ► Non-steroidal anti-inflammatory, anti-gout (relieves inflammation and pain of acute gout but does not increase expulsion of uric acid, is used with an alkaline diuretic), emetic, cathartic. Anti-chemotactic, antiphlogistic, inhibitor of mitosis. Highly toxic. Used for external application to lessen inflammation and pain.

Key application ► In acute gout attack. (*German Commission E.*)

The fresh corms and aerial parts of a sample from Jammu yielded 0.94% and 070% of total alkaloids, the major being colchicine 0.40% and 0.20% respectively. Colchicine analogs—decteyl thiocolchicine (DTC), decetylmethylcolchicine (DMC) and trimethylcolchicinic acid (TMCA) were effective in the treatment of gout; DTC may elicit agranulocytosis.

Colchicine binds to tubulin, the protein subunit of microtubules. Its most important biological effect is the inhibition of processes that depend upon microtubule function by blocking

C

polymerization. In preventing microtubule formation, colchicine has been shown to inhibit catecholamine secretion from adrenal medulla, iodine secretion from thyroid gland and prolactin secretion from pituitary tumour cells. It inhibits stimulated insulin secretion from isolated perfused pancreas and islets in vitro.

The use of Colchicum for long periods is not recommended owing to its toxicity in larger doses (even 7 mg of colchicine has caused death) and its depressant action upon central nervous system.

Prolonged use of *Colchicum autumnale* may cause agranulocytosis, aplastic anaemia and peripheral nerve inflammation. (Sharon M. Herr.)

Coleus amboinicus Lour.

Synonym ► *C. aromaticus* Benth.

Family ► *Lamiaceae.*

Habitat ► Native to Indonesia.

English ► Indian Borage.

Ayurvedic ► Parna-yavaani.

Siddha/Tamil ► Karpoorvalli.

Folk ► Pattaa Ajawaayin. Pattharachuur (Bengal).

Action ► Leaf—used in urinary diseases, vaginal discharge, colic and dyspepsia. Stimulates the function of liver. Also given in epilepsy and other convulsive affections, asthma, bronchitis, cold and chronic cough. Bruised leaves are applied to burns; leaf juice to chapped lips.

The leaf extract has shown regulatory influence on calcium oxalate stone formation in experimental rats. In folk medicine, leaves are used internally for expelling kidney stone (the herb is also known as Paashaanbhedi).

Homoeopathic medicine, prepared from fresh leaves, is used in the affections of urinary organs, especially in difficult urination or in burning pains during and after urination.

The aerial parts from Pakistan yield an essential oil (0.1%) which contains thymol (79.6%); whereas in Fijian sample of leaves carvacrol and camphor are major constituents. Leaves contain a large amount of oxalacetic acid, flavonoid, cirsimaritin and beta-sitosterol.

Dosage ► Leaf—5–10 ml juice. (*CCRAS.*)

Coleus barbatus Benth.

Synonym ► *C. forskohlii* Briq. *Plectranthus barbatus* Andr.

Family ► *Lamiaceae.*

Habitat ► The sub-tropical Himalayas of Kumaon and Nepal; cultivated in Andhra Pradesh.

Ayurvedic ► Gandira (*Achyranthes aquatica* Br. is also equated with Gandira). (Doubtful synonym.)

Folk ► Garmar (Gujarat), Gurmal.

Action ► Root and leaf—spasmolytic, antithrombotic, anti-inflammatory, lipolytic.

In experimental amoebiasis of rats, the root powder and ethanolic extract

showed amoebicidal activity against *Entamoeba histolytica*.

An alcoholic extract of the roots and essential oil from it, were found to inhibit passive cutaneous anaphylaxis in the mouse and rat.

The plant produces the labdane diterpenoid, forskolin in its tuberous roots.

Forskolin was discovered during a screening of medicinal plants by Central Drug Research Institute, Lucknow, India, in 1974. (*Planta Medica,* 1985, 51, 473–477.) The screening revealed the presence of a hypotensive and spasmolytic principle, named coleonol (later the name was changed to forskolin). The basic mechanism of forskolin is the activation of an enzyme, adenylate cyclase, which increases the amount of cyclic adenosine monophosphate (cAMP) in cells. Raised intracellular cAMP level exhibits following physiological effects : inhibition of platelet activation and degranulation; inhibition of mast cell degranualation and histamine release; relaxation of the arteries and other smooth muscles; increased insulin secretion; increased thyroid function; increased lipolysis.

Forskolin, in clinical studies, reduced intraocular pressure when it was applied to the eyes for treating glaucoma. It has been shown to be a direct cerebral vasodilator. It has also been studied as a possible bronchodilator (in the treatment of asthma) and has been shown to effectively reverse methacholine-induced broncho constriction in extrinsic asthmatics.

Standardized Coleus extracts containing forskolin (18% in 50 mg) find application in weight-loss programmes. (Michael T. Murray.)

Studies on forskolin and some 50 derivatives of the compound indicate that the natural product is more active than the analogs prepared from it.

The wild var. is known as Kaffir Potato.

Coleus vettiveroides K. C. Jacob.

Family ► *Lamiaceae.*

Habitat ► Native to Sri Lanka. Now under cultivation in Kerala and Tamil Nadu.

Ayurvedic ► Hrivera, Hiruberaka, Ambu, Ambhas, Udaka, Udichya, Jala, Vaari, Toya, Vaalaka, Baalaa, Baalaka, Baala. (Also equated with *Pavonia odorata* Willd.)

Siddha/Tamil ► Kuruver.

Folk ► Iruveli (Kerala).

Action ► Leaves—cooling and carminative, used for indigestion, dyspepsia, dysentery, also for ulcers, bleeding disorders, dermatitis.

C. zeylanicus (Benth.) Cramer (synonym *Plectranthus zeylanicus* Benth.) has been identified as a source of Ayurvedic drug Hrivera. The juice of stem and leaves, mixed with honey, is prescribed for diarrhoea.

The plant afforded abietane type diterpenoides and a stereoisomer.

Colocasia esculenta (Linn.) Schott.

Synonym ► *C. antiquorum* Schott.

C

Family ▶ *Araceae.*

Habitat ▶ Cultivated throughout India.

English ▶ Taro, EdibleYam.

Ayurvedic ▶ Pindaaluka, Aaluki.

Siddha/Tamil ▶ Chaembu, Shaeppam-kizhangu.

Folk ▶ Arvi, Ghuiyaa.

Action ▶ Juice from petiole—styptic, rubefacient. Juice of corn—used in alopaecia.

The leaves contain flavones, apigenin and luteolin, also anthocyanins. Leaves cause severe irritation in mouth. Cooked leaves are a source of dietary fibre for diabetics helping in lowering post-prandial blood glucose level. A significant increase in total lipids, total cholesterol and triglyceride levels was observed in hypercholesterolaemic rats when fed with dried leaf powder.

The pressed juice of the petioles is used as an astringent and styptic. All parts of the plant show an acridity. The acridity is removed by boiling and by addition of baking soda.

From the tubers two dihydroxysterols, besides beta-sitosterol and stigmasterol, have been isolated. Five novel aliphatic compounds have been reported. Trypsin inhibitors are isolated from the tubers.

The total amino acids recorded in the tubers range from 1380 to 2397 mg/100 g. The lysine concentration was relatively low. Besides starch, the tubers contain natural polysaccharides with 56% neutral sugars and 40% anionic components. Steamed corms contain 30% starch and 3% sugar.

Commelina benghalensis Linn.

Family ▶ *Commelinaceae.*

Habitat ▶ Throughout India in moist places.

Ayurvedic ▶ Kanchata, Karnamorata, Karnasphota.

Siddha/Tamil ▶ Kanavazhai, Kananagakarai.

Folk ▶ Kenaa (vegetable) (Maharashtra).

Action ▶ Emollient, demulcent, laxative, diuretic, antileprotic.

The rhizomes are starchy and mucilaginous.

The plant contains *n*-octacosanol, *n*-triacontanol, *n*-dotriacontanol. stigmasterol, beta-sitosterol and campesterol.

Commelina nudiflora Linn.

Family ▶ *Commelinaceae.*

Habitat ▶ Throughout India.

Ayurvedic ▶ Kanchata (var.).

Folk ▶ Kenaa (vegetable) (Maharashtra).

Action ▶ Antidermatosis. The plant is used as a blood purifier.

Commelina diffusa Burm f; *C. paludosa* Blume synonym *C. obliqua* Buch.-Ham. and *C. salicifolia* Roxb. are related species of Kanchata and are known as Kenaa vegetable.

Commiphora sp. (Burseraceae).

Refer to Balsamodendron sp.

Conium maculatum Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► North temperate regions.

English ► Spotted Hemlock, Poison Hemlock.

Unani ► Khardmaanaa, Shuk.

Action ► Sedative, anodyne, antispasmodic. Used for relief in whooping cough, asthma; paralysis; epilepsy. Antidote to strichnine poisoning and other poisons of the same class. Highly toxic. Mother tincture of Hemlock is used in homoeopathy for prevention of immature cataract.

All parts of the plant contain alkaloids—highest in aerial parts (1.77%) and lowest in stems. Gamma-coniceine is the principal alkaloid in the leaves, whereas N-methylconiine is the major alkaloid in mature fruits. Beside the alkaloids, a flavone glycoside, diosmin and chlorogenic acid have been reported in the leaves and inflorescence. Ripe seeds yield coumarins, bergapten and xanthotoxin. Experimentally, the plant exhibited teratogenic properties. (Rarely used today.)

Berries are toxic at 10 g, leaves at 30 g and coniine at 150 mg. (Francis Brinker.)

Convolvulus arvensis Linn.

Family ► *Convolvulaceae.*

Habitat ► Throughout India, up to 3,000 m in the Himalayas.

English ► Deer's Foot.

Ayurvedic ► Bhadrabalaa, Hiranpadi.

Unani ► Lablaab.

Folk ► Hirankhuri, Haranpagaa.

Action ► Plant—cooling, anticonvulsant. Root—cathartic.

Plant extract—hypotensive in cats; raises coronary rate. Alkaloids—hypotensive, without vasodilation. EtOH extract—anticonvulsant in rats. Aqueous extract—exhibited muscarinic and micotinic activity.

The dried rhizome contains 4.9% resin. The cathartic action of the resinous substance is about one third of that of jalap (*Ipomoea purga* Hayne) resin.

All parts of the plant contain beta-Me-esculetin; aerial parts *n*-alkanes, *n*-alkanols, alpha-amyrin and sterols; roots gave cuscohygrine.

Convolvulus pluricaulis Choisy.

Synonym ► *C. microphyllus* Sieb. *C. prostratus* Forsk.

Family ► *Convolvulaceae.*

Habitat ► Throughout India, ascending to 2,000 m in the Himalayas.

Ayurvedic ► Shankhapushpi, Shankhaahvaa, Kshirapushpi, Maangalya Kusuma (white-flowered). Blue-flowered var., Vishnukraanti, Vishnukraantaa, Vishnugandhi is equated with *Evolvulus alsinoides* Linn.

Unani ► Sankhaahuli (blue-flowered)

Siddha/Tamil ► Sivakraandi (white-flowered), Vishnukraandi (blue-flowered).

Action ► Plant—brain tonic, tranquilizer used in nervine disorders, mental aberration, anxiety neurosis, internal haemorrhages, spermatorrhoea. Also astringent, antidysenteric, antispasmodic, antiphlogistic, febrifuge, alterative. Flowers—styptic, used for uterine bleeding. Leaf—antiasthmatic, used in chronic bronchitis. Root—used in gastric and duodenal ulcers, uterine affections and for promoting fertility.

The Ayurvedic Pharmacopoeia of India recommends the plant for epilepsy. The plant contains sankhpushpine alkaloids.

The alcoholic (50%) extract of the plant, when administered to rats (through gastric intubation at different intervals), has shown enhanced neuropeptide synthesis of the brain. It induces an increase in brain protein content and increases acquisition efficiency.

Evolvulus alsinoides contains pentatriacontane, triacontane and beta-sitosterol.

Shankhapushpi Syrup (a compound containing *C. pluricaulis, Centella asiatica, Nardostachys jatamansi, Nepeta hindostana, Nepeta elliptica* and *Onosma bracteatum*), when administered with phenytoin, a modern antiepileptic drug, reduced not only antiepileptic activity of phenytoin but also lowered plasma phenytoin levels.

Dosage ► Whole plant—3–6 g powder. (*API* Vol. III.)

Convolvulus scammonia Linn.

Family ► *Convolvulaceae.*

Habitat ► A native to the Mediterranean region.

English ► Scammony.

Unani ► Saqmunia.

Action ► Resin from rhizomes—hydragogue, Cathartic, administered in dropsy and anascara.

Most of the resin available in India is imported from Syria and Asia Minor and is grossly adulterated.

The roots contain on an average 8% resin together with dihydroxy cinnamic acid, beta-methyl-esculetin, ipuranol, surcose, a reducing sugar and starch. The resin consists of the glycosides and methylpentosides of jalapinolic acid and its methyl ester.

Large doses cause acute gastro-intestinal irritation, and, if absorbed, produce cystitis and nephritis.

Coptis teeta Wall.

Family ► *Ranunculaceae.*

Habitat ► Mishmi Hills in Arunachal Pradesh. Cultivated commercially in China.

Ayurvedic ► Mamira, Maamiraa, Tiktamuulaa. (Pita-muulikaa and Hem-tantu are provisional synonyms.)

Unani ► Maamisaa, Maamiraa.

Folk ► Titaa (Bengal and Assam).

Action ► Stomachic, antiperiodic, antibacterial, antifungal. Prescribed

in debility, convalescence, intermittent fevers, dyspepsia, dysentery and intestinal catarrh. Used as a local application in thrush.

The rhizomes contains berberine (9%) as the major alkaloid; other alkaloids present are: coptin (0.08%), coptisin 0.02%) and jatrorrhizine (0.01%). Samples from China contained 9.26–12.23% berberine, 2.39–3.25% coptisin and 3.20–4.46% jatrorrhizine. In China, the herb is used as an antidiabetic; the ethanolic (50%) extract exhibited hypoglycaemic and hypotensive activity.

The drug due to berberine and its related alkaloids promoted reticuloendothelium to increased phagocytosis of leucocytes in dog blood *in vitro* and *in vivo*.

Coptis chinensis (Huang Lian) inhibited erythrocyte haemolysis, decreased lipid peroxidation in brain and kidney, decreased generation of superoxide peroxidation and decreased hydroxyl radicals in rats. (*Life Sci,* 2000, 66(8), 725–735.)

Dosage ► Root—1–3 g powder. (*CCRAS.*)

Corallocarpus epigaeus Benth. ex Hook. f.

Family ► *Cucurbitaceae.*

Habitat ► Punjab, Uttar Pradesh, Bihar, West Bengal, Gujarat, Madhya Pradesh and Peninsular India.

Ayurvedic ► Shukanaasaa, Nahikaa, Katunaahi, Paataala-garudaa. (*Cocculus hirsutus* is used as Paataala-garudi).

Siddha/Tamil ► Kollankovai, Aaakaasagarudam.

Action ► Laxative. Root used during later stages of dysentery and chronic mucous enteritis; also in syphilitic rheumatism. The herb shows no apparent effect on acute dysentery.

The root contains a bitter principle allied to bryonin.

Corchorus aestuans Linn.

Synonym ► *C. acutangulus* Lam.

Family ► *Tiliaceae.*

Habitat ► Throughout the warmer parts of India, as a weed.

English ► White Jute. (Tossa Jute is equated with *C. olitorius* Linn.).

Ayurvedic ► Chunchu, Chanchu, Chinchaa. (bigger var. is equated with *C. olitorius*; smallar var. with *C. capsularis.*)

Folk ► Chench shaaka, Titapat (Bengal).

Action ► Seeds and aerial parts—stomachic, anti-inflammatory. Used in pneumonia.

The seeds contain cardenolides, beta-sitosterol, ceryl alcohol, oligosaccharides. The aerial parts contain triterpenoidal glycosides—corchorusins. Corchorusins have similar structural similarity with saikosaponins (isolated so far from *Bupleurum* sp. of Japan, China and Korea) and some of them exhibit antiviral, anti-inflam-

C

matory and plasma-cholesterol lowering activities.

The alcoholic extract of the entire plant was found to have anticancer activity against epidermal carcinoma of nasopharynx in tissue culture. Alcoholic extract and glycosides of seeds exhibit cardiotonic activity. Digitoxose containing glycosides are reported to be present in *Corchorus* sp.

C. olitorius Linn. is known as Jew's Mallow (Pattaa Shaaka or Patuaa Shaaka).

Corchorosid A, reported from the plant, improved cardiac competence experimentally.

The leaf extracts may be used as moisturizers in skin cosmetics. The extracts consist of uronic acid containing muco-polysaccharide, Ca, K and P, among others, which act as effective moisturizers.

Corchorus capsularis Linn.

Family ▶ *Tiliaceae.*

Habitat ▶ Throughout warmer parts of India; extensively cultivated in West Bengal.

English ▶ White Jute.

Ayurvedic ▶ Kaala shaaka.

Siddha/Tamil ▶ Pirattai-keerai.

Folk ▶ Naadi shaaka, Narichaa. Titapat (Bengal).

Action ▶ Leaves—stomachic, carminative, diuretic, antidysenteric (dried leaves). Seeds—purgative.

Seeds contain cardiac glycosides. These include two monosides, helveticoside and corchoroside A and two polar glycosides, erysimoside and olitoriside. Leaves contain beta-sitosterol-glucoside. Corchoroside A exhibited cardiotonic properties.

The aqueous/alcoholic extracts, containing polysaccharides, may be used in preparations of skin cosmetics or hair preparations for their moisturizing effect.

Corchorus fascicularis Lam.

Family ▶ *Tiliaceae.*

Habitat ▶ Throughout warmer parts of India.

Ayurvedic ▶ Chanchuka, Chanchu.

Folk ▶ Chanchu shaaka, Baaphali.

Action ▶ Astringent, spasmolytic, restorative, mucilaginous.

The plant contains betulinic acid and beta-sitosterol. Seeds yield cardenolides including trilocularin. The glycosides of the plant were found to be devoid of any effect of its own on smooth muscle of guinea pig ileum, but produced spasmolytic effect against acetylcholine, histamine and bradykinin. Direct action of the drug was observed on rabbit intestines. Slight cardiac depressant effect was found on isolated amphibian heart preparation.

Corchorus depressus (L.) Christensen, found in drier parts of North India, is known as Bhauphali (Delhi).

The Plant is used as a cooling medicine in fevers; its mucilage is prescribed in gonorrhoea, also for increasing the viscosity of seminal fluid. An extract

of the plant is applied as a paste to wounds.

The plant contains alpha-amyrin derivatives, together with apigenin, luteolin, sitosterol and its glucoside. Presence of quercetin and kaempferol has been reported in leaves and flowers.

The plant exhibits antimicrobial and antipyretic activities.

Cordia myxa Roxb. non Linn.

Synonym ► *C. dichotoma* Forst. f. *C. obliqua* Willd.

Family ► *Boraginaceae.*

Habitat ► Throughout India, wild and often planted.

English ► Sabestan Plum.

Ayurvedic ► Shleshmaataka, Shelu, Bahuvaara, Bahuvaaraka, Bhutvrkshak, Uddaalaka Shita, Picchila, Lisodaa.

Unani ► Sapistaan, Lasodaa.

Siddha/Tamil ► Naruvili.

Action ► Fruit—astringent, demulcent, expectorant, diuretic, anthelmintic, mucilaginous. Used in the diseases of the chest and urinary passage. Bark—used in dyspepsia and fevers. Kernels—externally applied to ringworm. Leaf—decoction used in cough and cold.

The fruits contain Ca 55, P 275, Zn 2, Fe 6, Mn 2, Cr 0.2 and Cu 1.6 mg/100 g (Chromium is of therapeutic value in diabetes).

Antinutritional factors are—phytic acid 355, phytate phosphorus 100 and oxalic acid 250 mg/100 g.

The seeds contain alpha-amyrin and taxifolin-3, 5-dirhamnoside, which showed significant anti-inflammatory activity. EtOH (50%) of leaves and stems—antimicrobial; aerial parts—diuretic and hypothermic.

Cordia rothii Roem. & Schult.

Family ► *Boraginaceae.*

Habitat ► Rajasthan, Gujarat, Deccan and Karnataka.

English ► Sebestan (smaller var.)

Ayurvedic ► Laghu-shleshmaataka, Lisodaa.

Siddha/Tamil ► Naruvili.

Folk ► Gondi.

Action ► See *C. myxa.*

Bark—astringent; decoction is used as a gargle.

Cordia wallichii G. Don.

Synonym ► *C. oblique* Willd. var. *wallichii.*

Family ► *Boraginaceae.*

Habitat ► Gujarat, North Kanara and Deccan.

English ► Sebestan (bigger var.).

Ayurvedic ► Shleshmaataka (bigger var.), Uddaalaka, Bahuvaaraka.

Siddha/Tamil ► Perunaruvili.

Folk ► Gondi.

Action ► Fruit—astringent, demulcent, expectorant.
See *C. myxa.*

C

Coriandrum sativum Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Cultivated chiefly in Madhya Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Tamil Nadu, Karnataka and Bihar.

English ► Coriander.

Ayurvedic ► Dhaanyaka, Kustumburu, Dhaanyeyaka, Dhanika, Dhanikaa, Dhaanaa, Dhaanya, Dhaniyaa, Kunati, Chhatraa, Vitunnaka.

Unani ► Kishneez.

Siddha/Tamil ► Kotthamalli.

Action ► Stimulant, stomachic, carminative, antispasmodic, diuretic; also hypoglycaemic and anti-inflammatory. Oil—bactericidal and larvicidal. Used in China as a remedy for measles, diabetes, aerophagy and gastroenteritis.

Key application ► In dyspeptic complaints, loss of appetite. (*German Commission E, British Herbal Pharmacopoeia, Indian Herbal Pharmacopoeia.*)

Coriander contains 0.5–1% volatile oil, consisting mainly of delta-linalool (55–74%), alpha-pinene and terpinine. It also contains flavonoids, coumarins, phthalides and phenolic acids (including caffeic and chlorogenic).

Aqueous extract of the roasted seeds contains large amounts of acetylcholine and its precursor choline. (Choline is found useful in preventing and curing certain liver disorders.) The extract shows cholinomimetic effects experimentally.

Coriandrin, an antiviral agent, has been synthesized from the aerial parts. The plant forms an ingredient of a Pakistani herbal drug (Intellan) which is considered to be a neuro-energizer.

In Unani medicine, an infusion of fruits is also used in bleeding piles, neuralgia, cephalalgia and spermatorrhoea.

Dosage ► Fruit—1–3 g powder. (*API* Vol. I.)

Corydalis govaniana Wall.

Family ► *Papaveraceae.*

Habitat ► The West Himalayas, from Kashmir to Kumaon.

Ayurvedic ► Bhootakeshi (a doubtful substitute for Bhootajataa, *Nardostachys jatamansi* DC.) Species of *Selinum* are also used as Bhootakeshi.

Action ► Sedative, spasmolytic, hypotensive, nervine, antiseptic. Used in cutaneous and scrofulous affections, chronic fever and liver complaints.

The roots contain phthalide isoquinoline alkaloids. In addition, stems and leaves contain tetrahydroprotoberberines.

A related species, *C. solida,* indigenous to Siberia, northern China and Japan, contains alkaloids including corydalmine, tetrahydropalmatine, protoberberine-type alkaloid lenticin. The alkaloids are analgesic and sedative and have been shown to work, at least in part, by blocking the dopamine receptors in the central nervous system.

The powdered rhizome of *Corydalis* possesses one-hundredth of the analgesic potency of morphine.

Corylus avellana Linn.

Family ▶ *Betulaceae.*

Habitat ▶ Native to Europe and Western Asia; common in gardens on hill-station in India.

English ▶ European Hazel, Filbert.

Unani ▶ Funduq, Bunduq.

Action ▶ Kernel—nutritive, astringent; used as an anabolic tonic and in sexual debility in Unani medicine. The oil is used to reduce cholesterol and as an antioxidant.

The kernel of the European Hazel Nut contains protein 12.7%, carbohydrate 17.7%, fat 60.9% and phosphorus 0.35%. The fatty acid components of the kernel oil are : oleic 88.1%, linoleic 2.9%, palmitic 3.1%, stearic 1.6% and myristic 2.2%.

The stem bark contains a biologically active cyanidanol glycoside.

The Turkish Hazel Nuts are rich in mono and polysaturated fatty acids—oleic 82% and linoleic 9%; also gave beta-sitosterol.

The Turkish Hazel Nuts are imported into India during the winter season.

Corylus colurna Linn.

Family ▶ *Betulaceae.*

Habitat ▶ Western temperate Himalayas from Kashmir to Kumaon; common in Kashmir forests.

English ▶ Turkish Hazel.

Folk ▶ Virin (Kashmir). Thangi, Urni (Punjab). Kapaasi, Bhotiaa Badaam (Kumaon).

Action ▶ A mixture of flavonoids, isolated from the leaves, has shown potent antiperoxidative and oxygen radical scavenging properties. It exhibits very low toxicity and can be used as an alternative to the toxic synthetic antioxidants used for the treatment of free radical-mediated injuries. See also *C. avellana.*

Himalayan Hazel, occurring in central and eastern Himalayas, locally known as Curri and Langura, is equated with *Corylus ferox* Wall.

Coscinium fenestratum Colebr.

Family ▶ *Menispermaceae.*

Habitat ▶ South India, particularly in Western Ghats.

English ▶ False Calumba.

Ayurvedic ▶ Pitachandana, Pitasaara, Harichandana, Kaaliyaka, Kalambaka.

Siddha/Tamil ▶ Maramanjal, Manjalkodi.

Folk ▶ Jharihaldi.

Action ▶ Root—stomachic, diuretic, hypotensive, antidysenteric, antibacterial, antifungal, bitter tonic in dyspepsia and debility.

The stems and roots of Kalambaka contain alkaloids including berberine

C

3.5–5% and jatorrhizine. Stems contain ceryl palmitic acid and oleic acid.

The plant is also used against fractures; for dressing wounds and ulcers and in cutaneous leishmaniasis.

The stems are used in South India as a substitute for Berberis (Daaruharidraa); also as an Indian substitute for True Calumba (*Jateorhiza palmata* Miers).

Dosage ► Root—3–5 g powder; decoction—50–100 ml. (*CCRAS.*)

Costus speciosus (Koenig) Sm.

Family ► *Zingiberaceae.*

Habitat ► Assam, North Bengal, Khasi and Jaintia Hills, sub Himalayan tracts of Uttar Pradesh and Himachal Pradesh and Western Ghats.

English ► Canereed, Wild Ginger.

Ayurvedic ► Kebuka, Kembuka.

Siddha/Tamil ► Krrauvam, Malai Vasambu, Ven Kottam.

Folk ► Kebu.

Action ► Astringent, purgative, depurative, anti-inflammatory (used in gout, rheumatism; bronchitis, asthma, catarrhal fevers, dysuria), anthelmintic, antivermin, maggoticide, antifungal.

The rhizomes contain saponins—dioscin, gracillin and beta-sitosterol-beta-D-glucoside. The alkaloids show papaverine-like smooth-muscle-relaxant activity, cardiotonic activity like that of digitalis and antispasmodic, CNS-depressant, diuretic and hydrocholeretic activities. Saponins show significant anti-inflammatory and antiarthritic activity.

The seeds also contain saponins and exhibit potent and sustained hypotensive and bradycardiac activities in dogs with low toxicity and without any haemolytic activity; also weak spasmolytic activity on isolated guinea-pig ileum.

All parts of the plant yield steroidal sapogenin, diogenin (quantity varies from 0.32 to 4%).

(Not to be confused with Kushtha of Indian medicine, *Saussurea lappa.*)

Crataegus crenulata Roxb.

Family ► *Rosaceae.*

Habitat ► The Himalayas from Sutluj to Bhutan at altitudes of 800–2,500 m.

Folk ► Ghingaaru.

Action ► See *Cratageus oxyacantha*.

Crataegeus oxyacantha Linn.

Family ► *Rosaceae.*

Habitat ► British and European hedge plant, met with in the temperate Himalayas of Kashmir and Himachal Pradesh at an altitude of 1,800–3,000 m. (The plant does not thrive in the plains of India.)

English ► English Hawthorn.

Folk ► Ring, Ringo, Pingyat, Phindak, Ban Sanjli (Punjab hills).

Action ► Coronary vasodilator (strengthens heart muscle without increasing the beat in coronary arteries), antispasmodic, antihypertensive, sedative to nervous system, diuretic.

Key application ► In cases of cardiac insufficiency Stage II as defined by NYHA (New York Heart Association). An improvement of subjective findings as well as an increase in cardiac work tolerance, a decrease in pressure/heart rate product, an increase in the ejection fraction and a rise in the anaerobic threshold have been established in human pharmacological studies. (*German Commission E, WHO.*)

The active principles include oligomeric procyanidins and flavonoids.

The drug is official in *Homoeopathic Pharmacopoeia of India.*

Contraindicated in low blood pressure, chest pain, bleeding disorders. The herb may interfere with therapeutic effect of cardiac drugs. (Sharon M. Herr.) Preparations based on hydroalcoholic extracts of *Crataegus monogyna* or *C. laevigata* are used as Hawthorn in the Western herbal.

Crataeva nurvala Buch.-Ham.

Synonym ► *C. magna* (Lour.) DC.

Family ► *Capparidaceae.*

Habitat ► Wild as well as cultivated in gardens all over India.

Ayurvedic ► Varuna, Varana, Barnaa, Setu, Ashmarighna, Kumaarak, Tiktashaaka.

Unani ► Baranaa.

Siddha/Tamil ► Maavilingam.

Action ► Bark—diuretic (finds application in urinary disorders, including urolithiasis, prostatic hypertrophy, neurogenic bladder and urinary infections; uterine and gastro-intestinal problems). Juice of the bark is given to women after childbirth. Extract of root bark, mixed with honey, is applied to scrofulous enlargements of glands. Whole plant powder—cholinergic in smooth muscles including urinary bladder.

Key application ► As antiurolithiatic. (*Indian Herbal Pharmacopoeia.*)

The antiurolithic activity of the stem-bark is attributed to the presence of lupeol. Lupeol not only prevented the formation of vesical calculi, but also reduced the size of the preformed stones in the kidneys of calculogenic rats. It also reversed the biochemical parameters in urine, blood and serum towards normal.

The stem bark also exhibit anti-inflammatory activity, and is reported to stimulate bile secretion, appetite and bowel movement.

Dosage ► Stem bark—20–30 g for decoction. (*API* Vol. I.)

Cressa cretica Linn.

Family ► *Convolvulaceae.*

Habitat ► Costal regions of India.

Ayurvedic ► Rudanti, Rudantikaa, Rudravanti.

C

Siddha/Tamil ► Uppu Sanaga.

Folk ► Khardi.

Action ► Expectorant, stomachic, antibilious, alterative.

Air-dried, powdered whole plant gave *n*-octacosanol, scopoletin, umbelliferone, isopimpinellin, beta-sitosterol and its –D(+)-glucoside and quercetin.

Crinum asiaticum Linn.

Family ► *Amaryllidaceae.*

Habitat ► Wild as well as cultivated as an ornamental.

English ► St. John's Lily, Poison Bulb.

Ayurvedic ► Naagadamani, Naagapatra, Sudarshana (var.). *C. defixum* Ker.-Gawl, is equated with Sukhadarshana.

Siddha/Tamil ► Vishamoongil.

Action ► Bulb—laxative (a substitute for ipecacuanha), expectorant. Used in biliousness, and in strangury and other urinary affections. Also used for the treatment of burns, whitlow and carbuncle. Fresh root—diaphoretic, emetic. Leaves—expectorant; externally, anti-inflammatory (used in skin diseases and for reducing inflammations). Seed—emmenagogue, diuretic.

The bark gave sterols and triterpenoids. Seeds contain alkaloids—lycorine, crinamine and crinasiatine.

Crinum latifolium Linn.

Family ► *Amaryllidaceae.*

Habitat ► Wild as well as cultivated as an ornamental.

English ► Wide-leaved Crinum.

Ayurvedic ► Sudarshana, Sukhadarshana, Chakraangi, Somvalli, Madhuparnikaa.

Siddha/Tamil ► Vishamoongil.

Action ► Bulb—rubefacient, antirheumatic. Also used for piles and tubercular fistula.

The alkaloids, crinafoline and crinafolidine, have been isolated from the plant. These along with crinafoline methochloride exhibited significant tumour-inhibiting activity *in vivo*. The plant extract in also used in allergic condition. This activity is attributed to the presence of glucan A and phosphatidyllycorine.

A related species, *C. zeylanicum*, is known as Milk-and-Wine Lily.

Dosage ► Leaf, root—5–10 g paste. (*CCRAS.*)

Crocus sativus Linn.

Family ► *Iridaceae.*

Habitat ► Cultivated in Kashmir up to 2,000 m and in Chaubattia in Uttar Pradesh.

English ► Saffron, Crocus.

Ayurvedic ► Kumkuma, Rudhira, Vadrika, Kaashmira, Kaashmiraka, Vaalhika, Agnishikhaa, Ghrusrrn, Rakta, Kshataja. Keshara (usually Keshara indicates Naagakeshara, *Mesua ferrea* Linn.)

Unani ► Zaafraan.

Siddha/Tamil ► Kumgumappoo (dried stigma).

Action ► Stigma and style—nervine tonic, sedative, antispasmodic expectorant (in dry cough, whooping cough, bronchitis), stomachic, diaphoretic, emmenagogue.

The Ayurvedic Pharmacopoeia of India indicated the use of the stigma and style in migraine, chronic sinusitis, and in urinary obstruction, inflammation of the urinary tract.

The saffron is used in Chinese medicine for melancholia, depression, shock and menstrual disorders.

Saffron contains a volatile oil composed of terpenes, terpene alcohols and esters. The herb also contains crocin, picrocrocin, crocetin, carotenoids and riboflavin and thiamine.

Preliminary evidence suggests that crocetin may improved atherosclerosis by increasing plasma oxygen diffusion and decreasing cholesterol and triglyceride levels. In addition, crocetin binds to albumin, potentially increasing oxygen diffusion and improving atherosclerosis. (*Natural Medicines Comprehensive Database,* 2007.)

The stigma showed remarkable inhibitory effect on blood coagulation due to the presence of platelet aggregation inhibitor containing adenosine. It accelerated *in vitro* fibrinolytic activity of urokinase and plasmin.

Small amounts of Saffron stimulate gastric secretion; larger amounts stimulate uterine smooth muscle and exhibit emmenagogue and abortifacient effects.

Saffron extract showed cytotoxic and antimutagenic activity and antitumour activity against ascites tumours in mice. Chemical analysis indicated that the naturally occurring crocin may be the active principle responsible for the observed anticancer activity.

A xanthone, carotenoid glycosidic conjugate, mangi-crocin, isolated from saffron, showed significant adaptogenic activity. A natural antioxidant, isolated from saffron stem callus, showed better antioxidant activity than vitamin E. Saffron bulbs are toxic, stigmas in overdoses narcotic.

The dose of stigma and styles at 1.5–5.0 g is toxic. (Recommended dose : 0.5–1.5 g per day).

Dosage ► Dried style and stigma—20–50 mg (*API* Vol. IV.)

Crotalaria juncea Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout the plains of India, especially in South India.

English ► Sun Hemp.

Ayurvedic ► Shana, Shanapushpi, Malyapushpa.

Unani ► Sunn.

Siddha/Tamil ► Sanal, Manji, Sannappu.

Folk ► Jhanjhaniaa.

Action ► Leaf—demulcent, purgative, emetic, emmenagogue, abortifacient, ant-implantation. Given in diarrhoea, dysentery and bleeding disorders. Seeds—used in psoriasis and impetigo.

C

Seeds—hepatotoxic. Seed oil gave fatty acids—linoleic, linolenic and oleic.

Pyrrolizidine alkaloids—junceine, tricodesmine, riddelline, seneciphylline and senecionine were also obtained.

Dosage ▶ Seed—1–3 g powder. (*API* Vol. III.)

Crotalaria verrucosa Linn.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Tropical regions of India from Himalayas to Sri Lanka.

Ayurvedic ▶ Shanapushpi. Shana (var.).

Siddha/Tamil ▶ Sanal, Sannappu.

Folk ▶ Sanai, Jhanjhaniaa.

Action ▶ Juice of leaves—used for biliousness, dyspepsia, blood impurities, scabies and impetigo, both internally and externally.

Taraxerol, beta-sitosterol and linoleic, palmitic, stearic, lauric, oleic, linolenic, arachidic, myristic and ricinoleic acids have been isolated from fixed oil of the stem.

Dosage ▶ Seed—1–3 g powder. (*CCRAS.*)

Croton oblongifolius Roxb.

Family ▶ *Euphorbiaceae.*

Habitat ▶ Central, Western and Southern India, also eastwards to Bengal.

Ayurvedic ▶ Naagadanti. (Danti is equated with *Baliospermum montanum* Muell., Dravanti with *Jatropha curcas* Linn. and *Croton tiglium* Linn.)

Action ▶ Same as that of *C. tiglium.*

Croton tiglium Linn.

Family ▶ *Euphorbiaceae.*

Habitat ▶ Native to South-East Asia. Now cultivated in Assam, Bengal and South India.

English ▶ Purging Croton.

Ayurvedic ▶ Jayapaala, Dravanti, Dantibija, Tintidiphala.

Unani ▶ Habb-us-Salaateen, Jamaalgotaa, Hubb-ul-Malook.

Siddha/Tamil ▶ Nervaalam.

Action ▶ Cathartic, rubefacient, irritant. Used in ascites, anasarca, dropsy and enlargement of abdominal viscera.

The seed oil is purgative. It produces severe symptoms of toxicity when taken internally or applied externally to the skin.

Croton oil showed tumour-promoting activity on mouse skin. The skin irritant and tumour promoting diterpene esters of the tigliane type (phorbol esters) and toxins have been isolated from the seeds. (In China, where the herb is employed for the treatment of gastro-intestinal disturbances, the highest incidence of nasopharyngeal cancer has been reported.) 1 ml oil is usually fatal. Phorbols (terpenoids) from nonvolatile oil are

toxic. Crotin, a toxic albuminous substance, is not extracted in the oil. The plant caused haematuria and swelling of lymph glands in animals.

Dosage ► Seed—6–12 mg powder. (*API* Vol. IV.)

Cryptolepis buchanani Roem. & Schult.

Family ► *Asclepiadaceae; Periplocaceae.*

Habitat ► Throughout India.

English ► Indian Sarsaparilla (black var.).

Ayurvedic ► Krishna Saarivaa, Jambupatraa Saarivaa, Karantaa, Shyamalataa, Shyaama, Gopi, Gopavadhu, Kaalghatika.

Siddha/Tamil ► Maattan-kodi, Paal-Kodi, Kattupala.

Folk ► Karantaa, Anantamuula (Varanasi).

Action ► Blood-purifier, alterative. Used for rickets in children. In combination with *Euphorbia microphylla,* the herb is used as a galactagogue. A decoction of the stem is used as a supporting drug in paralysis; of the root bark in rheumatism.

The major constituent of the root extract is germanicol docosanoate. The roots contains cryptanoside C. The leaves gave cryptanoside A and B and a cardenolide, cryptosin.

Dosage ► Root—5–10 g (*API* Vol. IV.); infusion—50–100 ml. (*CCRAS.*)

Ctenolepis cerasiformis Naud.

Family ► *Cucurbitaceae.*

Habitat ► Wild on wastelands in Gujarat.

Ayurvedic ► Shankhini. (Also equated with Corivolvulus arvenis L.)

Folk ► Aankha-phuutaa-mani (Gujarat).

Action ► Emetic, drastic purgative. Used for internal tumours and abscesses. (*C.R.A.V.*)

Cucumis melo Linn. var. utilissimus Duth. & Fuller.

Synonym ► *C. utilissimus* Roxb.

Family ► *Cucurbitaceae.*

Habitat ► Cultivated in Punjab and Uttar Pradesh.

English ► Snake Cucumber.

Ayurvedic ► Ervaaru, Ervaaruka, Urvaaru, Bahukanda, Karkati.

Unani ► Kakari.

Siddha/Tamil ► Kakkarikkay, Vellarikkai.

Action ► Seeds—cooling, diuretic; used in painful micturition and suppression of urine.

The Ayurvedic Pharmacopoeia of India recommends the seed in dysuria and lithiasis.

Dosage ► Seed—3–6 g. (*API* Vol. II.)

Cucumis prophetarum Linn.

Synonym ► *C. myriocarpus* Naud.

C

Family ► *Cucurbitaceae.*

Habitat ► Wild on wastelands of Sindh, Baluchistan, Rajasthan; in dry districts of Bellary in the South.

English ► Wild Cucumber.

Ayurvedic ► Indravarruni (var.).

Folk ► Khar-indraayana.

Action ► Emetic, purgative. Toxic.

Fruit pulp—a bitter resinous body, myriocarpin, produces nausea and is slightly purgative.

The fruit contain cucurbitacin B,C,D and Q1, and propheterosterol and its acetate. Cucurbitacin Q1 is an anti-tumour agent. Amino acids from the fruits are leucine, iso-leucine, phenylalanine, valine, tryptophan, tyrosine, proline, alanine threonine, glycine, arginine, crystine and aspartic acid.

Cucumis sativus Linn.

Family ► *Cucurbitaceae.*

Habitat ► Cultivated for its edible fruits which are usually used as salad vegetable.

English ► Cucumber.

Ayurvedic ► Trapusha, Traapusha, Trapushi, Tiktakarkatikaa (bitter var.).

Unani ► Khiyaar, Khiraa.

Siddha/Tamil ► Vellarikkai.

Folk ► Khiraa.

Action ► Seed—used in dysuria, irritation of the urinary tract, cystitis. Reduces specific gravity of urine. Also used for tapeworms.

Cucumber contains rutin; seeds glucosides including cucurbitaside; leaves free cucurbitasides B & C, ferredoxin, alpha-spinasterol. Free and bound sterols are found in seedlings and in male and female flowers.

Presence of proteolytic enzymes, ascorbic acid oxidase and succinic and malic dehydrogenases has been reported.

Dosage ► Seed—3–6 g powder; fruit juice—25–50 ml. (*CCRAS.*)

Cucumis trigonus Roxb.

Synonym ► *C. pseudo-colocynthis* Royle.
C.callosus (*Rottl.*) Congn.
Bryonia callosa Rottl.

Habitat ► Wild throughout the drier upland tracts of India.

Ayurvedic ► Indravaaruni (var.).

Siddha/Tamil ► Kattutumatti.

Folk ► Vishlumbha, Bhakuraa.

Action ► Pulp of fruit—drastic purgative. Decoction of roots—milder in purgative action. Seeds—cooling, astringent; useful in bilious disorders. The fruit is used as a substitute for *Colocynth.*

The fruits contain steroid and triterpenoid compounds, cucurbitacin B and proteolytic enzymes. EtOH extract exhibits analgesic and anti-inflammatory activity; stimulates isolated uterus of guinea pigs.

Cucurbita maxima Duchesne.

Family ► *Cucurbitaceae.*

C

Habitat ► Cultivated throughout India.

English ► Red Gourd, Red Pumpkin.

Ayurvedic ► Peeta Kuushmaanda, Kuushmaandaka, Kuusmaandi, Karkaaruka, Seetaaphal.

Unani ► Kaddu-e-Sheerin, Aqteen.

Siddha/Tamil ► Parangikayi.

Action ► Fruit pulp—sedative, emollient and refrigerant; used as poultice, applied to burns, inflammations, boils, and burns. Seeds—diuretic, anthelmintic (for tapeworm). Because of their zinc content and antimitotic effect, seeds are used to arrest enlargement of prostate gland. Also used in cystitis and minor kidney dyfunction.

Pumpkin (*Cucurbita maxima* and *C. pepo*) seeds contain B vitamins, Vitamin A; minerals—calcium, iron, phosphorus, zinc; cucurbitacins; linonelic acid. An infusion of seeds (2–3 teaspoons) is taken as a diuretic and in hypertrophy of prostate.

Seeds of *C. maxima* contain sterol glycosides and sterol fatty acid esters which showed antitumour activity in mice.

The leaves contain calcium 36.38; magnesium 38.80; iron 2.04; zinc 0.76; and copper 0.42 (mg/100 g).

The seed oil contains sterols and triterpenoids. The oil is used in migraine and neuralgia.

Cucurbita moschata Duch. ex Poir.

Family ► *Cucurbitaceae.*

Habitat ► Native to Central America. Cultivated in warmer climate than that required for *C. maxima.*

English ► Squash.

Ayurvedic ► Kumshmaanda.

Action ► Fruit—used in headache, bronchitis, asthma; as diuretic in genitourinary disorders; as anthelmintic against tapeworms. Dried pulp is administered in haemptysis.

The lipids isolated from the seeds included glycerides, sterol esters, phosphatidylcholine and phosphatidylinositol. The aqueous extract of seeds showed potent gastroprotective activity against ethanol-induced gastric lesions in rats.

In Chinese medicine, *Cucurbita moschata* flower is used in jaundice, dysentery and cough; the root in jaundice, strangury, galactostasis and dysentery; the stem in irregular menstruation and scalds.

Cucurbita pepo Linn.

Family ► *Cucurbitaceae.*

Habitat ► Native to N. Mexico and eastern U.S.A. Now commonly cultivated in Northern India.

English ► Pumpkin, Marrow.

Unani ► Safed Kaddu, Kumhraa.

Siddha ► Suraikayi (Tamil).

Action ► See *C. maxima.*

Key application ► Seeds—in irritated bladder condition, micturition problems of benign prostatic

C

hyperplasia stages 1 and 2. (*German Commission E, The British Herbal Pharmacopoeia.*) In childhood enuresis noctruna. (*Expanded Commission E.*)

The roasted and fresh seeds yield 32.2 and 38.0% of fatty oil respectively. The oil filled capsules were administered to patients suffering from hypertrophy of the prostate. Results showed that the frequent urge to urinate decreased and the urine residues were minimized.

The oil consists of the glycerides of linoleic 45, oleic 25, palmitic and stearic acids 30%. Sterols have been isolated.

Cuminum cyminum Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to the Mediterranean region; now cultivated in Punjab and Uttar Pradesh.

English ► Cumin.

Ayurvedic ► Shveta-jiraka, Ajaaji, Shukla-ajaaji. The three jirakas mentioned in the Ayurvedic texts are: Jiraka, Krishna Jiraka (*Carum bulbocastanum* W. Koch.) and Kaaravi (*Carum carvi* Linn.).

Unani ► Safed Jeeraa, Kamun.

Siddha/Tamil ► Cheerakam.

Action ► Carminative, antispasmodic (used in dyspepsia and diarrhoea), stimulant, diuretic, antibacterial, emmenagogue, galactagogue.

Cumin seeds contain up to 14.5% lipids. They are reported to contain 14 flavonoid glycosides; 7 belong to apigenin, 5 to luteolin and 2 to chrysoeriol group. Major constituents of the essential oil include cuminaldehyde (20–40% of the oil) and *p*-cymene.

EtOH (50%) extract of the fruit exhibits spasmolytic and hypotensive activity.

Cumin is considered superior is comforting carminative qualities to Fennel or Caraway. Due to its disagreeable flavour it has been replaced by Caraway in European herbal medicine.

Cumin oil and cuminaldehyde have been reported to exhibit strong larvicidal and antibacterial activity.

Fine grinding of the seed can cause loss of 50% of volatile oil, most within one hour. (*Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Fruit—1–3 g powder. (*API* Vol. I.)

Cupressus sempervirens Linn.

Family ► *Cupressaceae.*

Habitat ► Native to Asia Minor, Syria and North Persia. The tree is a variety only known in the cultivated state in North-West India. (Chopra RN.)

English ► Mediterranean Cypress.

Ayurvedic ► Suraahva.

Unani ► Saro.

Siddha/Tamil ► Suram, Churam.

Action ► Tincture—vasoconstrictor, antiseptic, sedative, antispasmodic, diuretic. Used for cough, cold, bronchitis, varicose veins, piles,

menopausal cramps, leg-cramps. Essential oil—used only externally. Used in aromatherapy for massage (10 drops in 2 teaspoonful of almond oil).

The essential oil from the plant gave 73 compounds; major compound was alpha-pinene (47.00–52.76%); among others—D-camphane, D-silvestren, *p*-cymene, L-cadinenes, cedrol, terpineol, acetyl-and isovalerianyl monoterpene ester.

No longer taken internally as a diluted essential oil. Medicinal parts are cones, branches and oil.

Curculigo orchioides Gaertn.

Family ▶ *Amaryllidaceae; Hypoxidaceae.*

Habitat ▶ Sub-tropical Himalayas from Kumaon eastwards; Western Ghats from Konkan Southwards.

Ayurvedic ▶ Taalmuuli, Taalpatri, Krishna Mushali, Bhuumitaala.

Unani ▶ Musli Siyaah.

Siddha/Tamil ▶ Nilappanan kizhangu.

Action ▶ Nervine, adaptogenic, sedative, anticonvulsive, androgenic, anti-inflammatory and diuretic. Used in Jaundice, urinary disorders, skin diseases and asthma. Mucilaginous.

The rhizome contains saponins (curculigosaponin C and F promoted proliferation of spleen lymphocytes very significantly; F and G increased the weight of the thymus *in vitro* in mice); sapogenins; phenolic glycosides, a triterpene alcohol; a pentacyclic triterpene, an aliphatic compound, hentriacontanol, sitosterol, stigmasterol, cycloartenol and sucrose. A peptide, Curculin C, containing 114 amino acids, has been isolated from the fruit.

In traditional Chinese medicine, dried rhizome, containing curculigoside is used as a tonic for its immunological and protective property.

In Indian medicine, powdered rhizomes with milk are taken as a restorative tonic, also for sexual debility.

EtOH (50%) of the plant exhibited hypoglycaemic property.

Dosage ▶ Dried rhizome—3–6 g powder. (*API* Vol. IV.)

Curcuma amada Roxb.

Family ▶ *Zingiberaceae.*

Habitat ▶ Cultivated in Gujarat; wild in parts of West Bengal, Uttar Pradesh, Karnataka and Tamil Nadu.

English ▶ Mango-ginger, Wild Turmeric.

Ayurvedic ▶ Aamra Haridraa, Aamragandhi Haridraa, Surabhidaaru, Karpuraa.

Unani ▶ Aambaa Haldi, Daarchob.

Siddha/Tamil ▶ Mangaiinji.

Action ▶ Carminative, stomachic, appetizer, expectorant, antipyretic, anti-inflammatory. Specific in rheumatism and inflammation of liver; rheumatism; in contusions and sprains.

C

Presence of curcumin and a phytosterol is reported in the rhizome. The essential oil exhibited antimicrobial, antifungal and anthelmintic activity against tape worms.

Significant decrease was observed in liver total lipids and serum triglycerides of adult female rat when fed 10% Mango-ginger or 10% curcumin along with normal diet or a surcose-based hypertriglyceridaemic diet.

Dosage ► Rhizome—3–5 g powder; 10–20 ml juice. (*CCRAS.*)

Curcuma angustifolia Roxb.

Family ► *Zingiberaceae.*

Habitat ► Central Himalaya, Bihar, West Bengal, Maharashtra and South India.

English ► East Indian Arrowroot, Travancore Starch.

Ayurvedic ► Tvakshira, Tvakshiri.

Unani ► Tikhur, Tabaasheer.

Siddha/Tamil ► Ararut-gaddalu.

Action ► Starch—Cooling, demulcent, nutritious; used for asthma and bronchitis, as a substitute for Vansalochana (Bamboo-manna). Oil—antibacterial, antifungal, anthelmintic against tape worms. Rhizome—used for fever, diarrhoea, gravel, swellings and skin diseases.

The rhizomes yield 9.4% of an essential oil containing alpha-pinene 1.90, beta-pinene 17.92, *d*-ar-curcumene 27.84, *d*-camphor 12.20, *d*-alpha-terpineol 13.40, borneol 7.0, zingiberol 9.48 and a sesquiterpene alcohol 8.0%.

Dosage ► Rhizome—5–10 g powder. (*CCRAS.*)

Curcuma aromatica Salisb.

Family ► *Zingiberaceae.*

Habitat ► Cultivated chiefly in West Bengal and Kerala.

English ► Wild turmeric, Yellow Zedoary.

Ayurvedic ► Karpuraa, Aranya-rajani kanda, Van Haridraa.

Unani ► Daarchob.

Siddha/Tamil ► Kastoori Manjal.

Action ► Uses similar to those of *C. longa.* Essential oil from rhizomes—antimicrobial, antifungal and anthelmintic. The tubers are applied externally to bruises and sprains, to skin eruptions and infections. A decoction is administered in biliary gastritis.

Fresh rhizomes contain a number of sesquiterpenes including curdione and cerumol. Curcumol and curdione showed inhibitory activity on sarcoma 180 in mice.

The rhizomes yield 6.1% of an essential oil with *d*-camphene 0.8, *d*-camphor 2.5, sesquiterpenes 65.5, sesquiterpene alcohols 22.0, acids 0.7%. The essential oil shows high amounts of *ar*-curcumene (18.6%), beta-curcumene (25.5%) and xanthorrhizol (25.7%).

The oil, on intraperitoneal administration, partly reversed toxipathic hepatitis in mice induced by CCl4.

Dosage ► Rhizome—1–3 g powder. (*CCRAS.*)

Curcuma caesia Roxb.

Family ► *Zingiberaceae.*

Habitat ► Cultivated mainly in West Bengal.

English ► Black Zedorary.

Ayurvedic ► Rajani, Nishaa, Nishi, Raatri, Kaali Haldi, Nilkanth, Narkachura.

Unani ► Zarambaad.

Siddha/Tamil ► Manupasapu.

Action ► Carminative. Used externally for bruises and sprains.

The essential oil contains camphor as main constituent; others are camphane, bornylene and sesquiterpene hydrocarbons.

Curcuma longa Linn.

Synonym ► *C. domestica* Valeton.

Family ► *Zingiberaceae.*

Habitat ► Cultivated all over India, particularly in West Bengal, Tamil Nadu and Maharashtra.

English ► Turmeric.

Ayurvedic ► Haridraa, Priyaka, Haridruma, Kshanda, Gauri, Kaanchani, Krimighna, Varavarni-ni, Yoshitapriyaa, Hattavilaasini, Naktaahvaa, Sharvari.

Unani ► Zard Chob.

Siddha/Tamil ► Manjal.

Action ► Anti-inflammatory, cholagogue, hepatoprotective, blood-purifier, antioxidant, detoxifier and regenerator of liver tissue, antiasthmatic, anti-tumour, anticutaneous, antiprotozoal, stomachic, carminative. Reduces high plasma cholesterol. Antiplatelet activity offers protection to heart and vessels. Also protects against DNA damage in lymphocytes.

Key application ► In dyspeptic conditions. (*German Commission E, ESCOP, WHO.*) As anti-inflammatory, stomachic. (*Indian Herbal Pharmacopoeia.*)

The rhizomes gave curcuminoids, the mixture known as curcumin, consisting of atleast four phenolic diarylheptanoids, including curcumin and monodesmethoxycurcumin; volatile oil (3–5%), containing about 60% of turmerones which are sesquiterpene ketones, and bitter principles, sugars, starch, resin.

Curcumin related phenolics possess antioxidant, anti-inflammatory, gastroprotective and hepatoprotective activities. The antioxidant activity of curcumin is comparable to standard antioxidants—vitamin C and E, BHA and BHT.

The volatile oil, also curcumin, exhibited anti-inflammatory activity in a variety of experimental models (the effects were comparable to those of cortisone and phenylbutazone). Used orally, curcumin prevents the release of inflammatory mediators. It depletes nerve endings of substance P, the neurotransmitter of pain receptors.

C

Curcumin's cholesterol-lowering actions include interfering with intestinal cholesterol uptake, increasing the conversion of cholesterol into bile acids and increasing the excretion of bile acids via its choleretic effects.

Curcuminoids prevent the increases in liver enzymes, SGOT and SGPT; this validates the use of turmeric as a hepatoprotective drug in liver disorders. Curlone, obtained from the dried rhizome, is used against hepatitis.

Turmeric and curcumin increase the mucin content of the stomach and exert gastroprotective effects against stress, alcohol, drug-induced ulcer formation. (Curcumin at doses of 100 mg/kg weight exhibited ulcerogenic activity in rats.)

The ethanolic extract of the rhizome exhibited blood sugar lowering activity in alloxan-induced diabetic rats.

Piperine (a constituent of black and long pepper) enhances absorption and bioavailability of curcumin.

Dosage ► Cured rhizome—1–3 g powder. (*API* Vol. I.)

Curcuma zedoaria Rosc.

Family ► *Zingiberaceae.*

Habitat ► Cultivated throughout India; wild in Eastern Himalaya.

English ► Zedoary, Zerumbet.

Ayurvedic ► Karchuura, Draavida, Palaashi, Kachura, Gandhmuulaka, Shati.

Unani ► Zarambaad.

Siddha/Tamil ► Kichhilikkizhangu.

Action ► Carminative, stomachic, gastrointestinal stimulant, diuretic, expectorant, demulcent, rubefacient. Used in flatulence and dyspepsia. Fresh root is used for checking lecorrhoeal discharge; also for blood purification. Zedoary's effect on digestive organs is similar to ginger but milder.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the rhizome in goiter.

The rhizomes are a source of Shoti Starch, used as a food for babies and convalescents, recovering from chronic stomatitis. It is cooling and demulcent.

Zedoary, dried rhizomes, contains a number of terpenoids, including curcumene, curcumenone, curdione, curcumenol. Curzerenone, furanogermenone, germacrone, germacrone epoxide; a volatile oil (1.0–1.5%) resembling ginger oil, and starch (50%).

Zedoary is thought to stimulate bile production (due to sesquiterpene ketones) and gall bladder emptying (due to cucuminoid constituents).

The sesquiterpenes, germacrone, germacrone epoxide, curzerenone and curcumenol showed CNS depressant properties. Curzerenone also showed a potent protective effect against induced lesions in rats. Both curzerenone and curcumenol showed a moderate analgesic action.

The terpenoid furanogermenone exhibits antiallergic activity. (Powdered zedoary, mixed with fructose, is used as an antiallergant in Japan.)

Curcumenol and curdione are shown to possess tumour-inhibiting property. The rhizome is used in China for extradural haematomas and certain types of tumours. It has been reported in China that zedoary reduced cervical cancer and increased the effects of chemotherapy and radiotherapy.

The volatile oil of zedoary exhibits antimicrobial and antifungal activity. The antifungal constituent of the oil has been reported as methyl-*p*-methoxycinnamate.

Dosage ▶ Dried rhizome—1–3 g powder. (*API* Vol. IV.)

Cuscuta epithymum Linn.

Family ▶ *Convolvulaceae.*

Habitat ▶ A parasitic climber, occuring in Europe, Asia, South Africa.

English ▶ Lesser Doddar, Hellweed, Devil's Guts.

Ayurvedic ▶ Aakaashvalli, Amarvalli, Amarvela.

Unani ▶ Aftimoon.

Folk ▶ Sitammapogunalu (Telugu).

Action ▶ Hepatic, laxative, carminative.

The parasitic plant accumulates alkaloids from the host plant. It contains flavonoids, including kaempferol and quercetin, hydroxycinnamic acid derivatives. Cuscutalin (1%) and cuscutin (0.02%) are main active principles of the plant. Seeds contain amarvelin, resins, oil (3%) and reducing sugars.

Used in urinary, spleen and liver disorders.

Cuscuta reflexa Roxb.

Family ▶ *Convolvulaceae.*

Habitat ▶ A parasitic climber common throughout India up to 3,000 m.

English ▶ Doddar.

Ayurvedic ▶ Amarvalli.

Unani ▶ Kasoos.

Action ▶ See *C. epithymum.*

The seeds contain amarbelin and kaempferol; stem gave cuscutin, cuscutatin, beta-sitosterol, luteolin, bergenin and kaempferol. The parasitic plant accumulates alkaloids from the host plant. The climber growing on *Mangiera indica* has been found to contain mangiferin.

Cyamopsis tetragonoloba (Linn.) Taub.

Family ▶ *Fabaceae; Papilionaceae.*

Habitat ▶ Cultivated throughout India, particularly in Haryana, Punjab, Rajasthan, Uttar Pradesh and Orissa.

English ▶ Cluster bean, Guar.

Ayurvedic ▶ Kshudra Shimbi, Gorakshaphalini, Guaar, Gwaalin.

Unani ▶ Guaar phali.

Siddha/Tamil ▶ Kothaveray.

C

Action ► Laxative, antibilious. Gum—hypoglycaemic, hypolipidaemic, appetite depressor (weight loss not observed), reduces glycosuria during gum supplementation.

The administration of Guar gum (15 g/day) with normal diet for 6 weeks produced significant reduction in plasma, total cholesterol and LDL-cholesterol. The gum (10 g daily) is reported to decrease blood-glucose level in normal and diabetic volunteers. The supplementation of the gum in the diet of insulin-dependent diabetics failed to improve the long-term diabetic control, but significantly reduced serum cholesterol levels.

Taking Guar gum orally with meals was found to lower post-prandial glucose levels in patients with type 1 diabetes. (*Am J clin Nutr,* 56, 1992, 1056–1060.)

Oral administration of an ethanol extract of powdered pods has shown significant antiulcer, antisecretory and cytoprotective effects on various experimentally-induced gastric lesions in rats.

Guarmeal contains galactomannan, 3-epikatonic acid and a saponin.

Cyclea arnotii Miers.

Synonym ► *C. peltata* Hook. F & Thoms.

Family ► *Menispermaceae.*

Habitat ► Throughout South and East India and in the Andaman and Nicobar Islands.

Ayurvedic ► Raaj-Paathaa (bigger var. of Paathaa, *Cissampelos pareira* Linn.).

Siddha/Tamil ► Para.

Action ► Roots—used in smallpox, bone fractures, malarial fever, jaundice, stomachache.

The root yielded tetrandrine as the major alkaloid. Tetrandrine (0.1 g/day) was found effective in the treatment of chloroquine resistant malaria.

Tetrandrine possesses cytotoxic and immunomodulatory properties and is indicated in the treatment of chronic inflammatory diseases. It shows antihypertensive, cardiac depressant and vasodilator effect. It also exhibits antiallergic activity.

Cydonia oblonga Mill.

Synonym ► *C. vulgaris* Pers.

Family ► *Rosaceae.*

Habitat ► Cultivated in Punjab, Kashmir and the Nilgiri hills.

English ► Quince Fruit.

Ayurvedic ► Amritaphala, Paatalaa, Simbitikaa.

Unani ► Bihi, Bihidaanaa.

Siddha/Tamil ► Shimaimathala.

Action ► Fruit pulp and seeds—soothing and demulcent; used in irritable bowel syndrome, diarrhoea, dysentery, constipation, and in irritable conditions of the mucous membrane. Leaf, bud and bark—astringent. Fruit—expectorant. Mucilage—used

externally for scalds, ulcers and burns.

The seed kernel contains the glycoside amygdalin, tannin, mucilage (about 22%), ash (1.3%) and fatty oil (14–19%).

In Greece, a tea prepared by boiling dry seeds in water is given in cystitis. The major water-soluble polysaccharide in the mucilage of seeds contains a high proportion of glucuronic acid residues.

The fruit contains pectin (yield 0.53% fresh weight) and is similar to that of apple. Ionone glycosides, along with octadienoic acid and its diol, have been isolated from the fruit.

Fruit juice contains thiamine, riboflavin, nicotinic acid, vitamin B6, inositol, pantothenic acid, folic acid and biotin.

The essential oil also gave a number of ionone-related compounds. The buds contain a cyanogenetic glycoside. The bark and shoots yield hydrocyanic acid on distillation.

Cymbopogon citratus (DC.) Stapf.

Synonym ► *Andropogon citratus* DC.

Family ► *Poaceae.*

Habitat ► Grown in Punjab, Maharashtra, Gujarat and Karnataka.

English ► Lemongrass.

Ayurvedic ► Bhuutika, Bhuutikaa.

Action ► Leaf—stimulant, sudorific, antiperiodic, anticatarrhal. Essential oil—carminative, anticholerin, depressant, analgesic, antipyretic, antibacterial, antifungal.

The lemongrass contains a volatile oil, with citral (about 70%), citronellal, geraniol and myrcene as its main constituents. Cetral and citronellal exhibit marked sedative activity.

The lemongrass is taken as a tea for digestive problems; it relaxes muscles of the stomach and gut, relieves spasm and flatulence. In catarrhal conditions, it is taken as a febrifuge.

An infusion of fresh leaves on oral administration has been found to produce dose-dependent analgesia in rats. This analgesic acitivity is caused by myrcene present in the leaf.

Geraniol and *d*-limonene from the essential oil induce activity of glutathione S-transferase, a detoxifying enzyme, which is believed to be a major factor for chemical carcinogen detoxification.

Cymbopogon jwarancusa (Jones) Schult.

Synonym ► *Andropogon jwarancusa* Jones.

Family ► *Poaceae.*

Habitat ► Himalayas from Kashmir to Assam, ascending up to more than 300 m and in the north-western plains.

Ayurvedic ► Bhuutikaa, Laamajjaka, Laamajja. (Subs. *Vetiveria zizanioides* (L.) Nash.)

Unani ► Izkhar.

Siddha/Tamil ► Vilaamichhan.

C

Action ► Blood purifier, bechic, anticholerin, emmenagogue, febrifuge, antirheumatic (also used in gout). Flower—styptic. Essential oil—antimicrobial.

Major constituent of the essential oil is piperitone (64.7%) others include borneol, cadinene, camphene, camphor, farnesene, geraniol, alpha-and beta-pinene. The antibacterial activity is attributed to piperitone.

Cymbopogon martinii (Roxb.) Wats.

Synonym ► *Andropogon martinii* Roxb.

Family ► *Poaceae.*

Habitat ► In drier parts of India; in Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh and Uttar Pradesh. The most important centers of Rosha Grass oil production are Betul and Mimar in Madhya Pradesh and Nasik in Maharashtra.

English ► Rosha Grass, Palmarosa.

Ayurvedic ► Rohisha-trn, Dhyaamaka.

Siddha/Tamil ► Kavathampillu.

Action ► Essential oil is used externally for stiff joints and lumbago, skin diseases, and in the treatment of baldness. Given internally in small doses in bilious complaints.

The essential oil obtained from motia var. is rich in geraniol (79–95%). The oil is known as Palmarosa, also Rusa. Sofia var. yields an oil with lesser geraniol. It is known as Gingergrass Oil.

Cymbopogon nardus (Linn.) Rendle.

Synonym ► *Andropogon nardus* Linn.

Family ► *Poaceae.*

Habitat ► Mainly in South India; cultivated to a small extent in warmer parts of India.

English ► Ceylon Citronella Grass.

Ayurvedic ► Jambir-trn (var.).

Siddha/Tamil ► Kamachipillu.

Action ► Leaf—stomachic, carminative, spasmolytic, mild astringent. Essential oil—stimulant, carminative, diaphoretic, rubefacient, antiseptic, antibacterial, antifungal, larvicidal.

Lemongrass and lemongrass oil preparations are used almost exclusively in combinations for disorders and discomforts of gastrointestinal tract, muscle pain and neuralgia, colds, various nervous disturbances and for conditions of exhaustion.

Major constituents of the essential oil are: citronellal 31.6, neral 28.6, citronellol 10.6, elemicine 7.3, geranyl acetate 4.6, elemol 3.7, limonene 3.2 and isopulegol 2.7%.

Citronella oil is also used as an insect repellent.

Cymbopogon schoenanthus Spreng.

Synonym ► *Andropogon schoenanthus* Linn.

Family ► *Poaceae.*

Habitat ► Warmer parts of India, from Punjab to Bengal and in South India.

English ► Camel-Hay.

Ayurvedic ► Rohisha (var.).

Unani ► Rusaa Ghaas, Izkhar.

Siddha/Tamil ► Karpurapul, Rohisha-trna.

Action ► Roots and rhizome—carminative, stimulant, diaphoretic, emmenagogue; used for fever, cold and genitourinary affections.

Fresh leaves yield an essential oil (yield 0.8%). It contains a series of methyl ketones, along with limonene 19.5, camphene 8.0%, and a group of oxygenated sesquiterpenes, the major being elemol 4.5%.

The fragrant oil is known as Rusa or Geranium Oil and is used as a substitute for rose oil. It exhibits stimulant, carminative, antispasmodic and diaphoretic properties. It is applied externally in rheumatism and neuralgia.

Cynara scolymus Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Monastery gardens of Europe. Now cultivated in India.

English ► Globe Artichoke.

Unani ► Harshaf.

Action ► Herb—antitoxic, liver restorative, hypocholesterolaemic. Water soluble extract is used for liver and renal diseases for its cholagogic and choleretic action (flow of bile increases up to 60 per cent). Artichokes assist digestion of fats, are known as diabetic's potato in Europe.

Key application ► In dyspeptic problems. (*German Commission E.*) *The British Herbal Pharmacopoeia* reported hepatic action.

All parts of the plant contains sesquiterpene lactone cynaropecrin and inulin. The leaves contain cynarin. Hepatic activity of the leaves is due to polyphenols such as cynarin, caffeoylquinic acid derivatives and flavonoids. Cynarin and caffeic acid exhibited hepatoprotective activity in CCl4-treated rats. (A minimum of 1% polyphenols and 0.2% flavonoids in the dried leaves is required for the activity.)

The plant is included in indigenous compound formulations recommended for viral and drug-induced hepatitis. All parts of the plant stimulate digestive secretions, especially bile, and are used for the treatment of gallbladder problems. Plant is used as a diuretic in dropsy. The plant is also used against atherosclerosis and for lowering cholesterol levels.

The extract gave mixed results in preventing alcohol-induced hangover. (*CMAJ*, 169, 2003, 1269–73; *Natural Medicines Comprehensive Database,* 2007.)

Cynodon dactylon Pers.

Family ► *Gramineae; Poaceae.*

Habitat ► Throughout India up to 3,000 m.

C

English ► Bermuda Grass, Bahama Grass, Couch Grass.

Ayurvedic ► Duurvaa, Bhaargavi, Shatvalli, Shatparvaa, Tiktaparvaa, Shatviryaa, Sahastravirya, Shitaa, Anantaa, Golomi.

Unani ► Duub.

Siddha/Tamil ► Arugampallu.

Action ► The grass is a reputed as a remedy in epitaxis, haematuria, inflammed tumours, whitlows fleshy excrescences, cuts, wounds, bleeding piles, cystitis, nephritis and in scabies and other skin diseases. It is credited with astringent, diuretic, antidiarrhoeal, anticatarrhal, styptic and antiseptic properties.

The Ayurvedic Pharmacopoeia of India recommended the dried fibrous root in menorrhagia, metrorrhagia and burning micturation.

Phenolic phytotoxins—ferulic, syringic, *p*-coumaric, vanillic, *p*-hydroxybenzoic and O-hydroxyphenyl acetic acids, are reported from the plant. The leaves contain tricin, flavone C-glycosides and a flavonoid sulphate.

Dosage ► Whole plant—10–20 ml juice (*API* Vol. IV.); root—5–10 ml juice (*API* Vol. III.)

Cyperus articulatus Linn.

Family ► *Cyperaceae.*

Habitat ► Native to Turkey; found in warm regions from Bengal to Sri Lanka in standing water of ponds and canals.

English ► Guinea Rush, Ardue.

Ayurvedic ► Kronchaadana.

Action ► Carminative, antiemetic (useful in vomiting of pregnancy), sedative (in dyspeptic disorders).

The root contains a sesquiterpene ketone, articulone, which is identical to cyperone. Volatile oil contains sesquiterpene hydrocarbons and sesquiterpene alcohols, including cyperenone.

Cypress is a totally different herb. See *Cupressus sempervirens.*

Cyperus esculentus Linn.

Family ► *Cyperaceae.*

Habitat ► Indigenous to West Asia and North Africa; occurring scattered from Punjab to Nilgiri hills as a grass-like sedge.

English ► Earth Almond, Chufa, Rush Nut, Tiger Nut. (Tuber is called Nut.)

Ayurvedic ► Chichoda.

Folk ► Chichodaa, Kaseru (Punjab). Also equated with Naagaramustaka.

Action ► A digestive tonic (used for indigestion, flatulence, colic, diarrhoea, dysentery); promotes diuresis and menstruation. The juice is taken for treating ulcers of the mouth and gums.

Tiger Nut is used in debility and as a nervine tonic due to its high crude lipid and carbohydrate contents and fairly good essential amino acid composition.

C

Cyperus rotundus Linn.

Family ► *Cyperaceae.*

Habitat ► Throughout India, as a weed upto 2,000 m.

English ► Nut Grass.

Ayurvedic ► Musta, Mustaa, Mustaka, Abda, Ambuda, Ambhoda, Ambodhara, Bhadra, Bhadraa, Bhadramusta, Bhadramustaa, Bhadramustaka, Ghana, Jalada, Jaldhara, Meghaahvaa, Nirada, Vaarida, Vaarivaaha, Payoda, Balaahaka. Ganda-Duurvaa (var.).

Unani ► Naagarmothaa, Saad-e-Kufi.

Siddha/Tamil ► Koraikkizhangu.

Folk ► Mothaa.

Action ► Carminative, astringent, anti-inflammatory, antirheumatic, hepatoprotective, diuretic, antipyretic, analgesic, hypotensive, emmenagogue and nervine tonic.

Used for intestinal problems, indigestion, sprue, diarrhoea, dysentery, vomiting and fever; also as a hypocholesterolaemic drug and in obesity.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the rhizome in rheumatism, inflammations, dysuria, puerperal diseases and obesity.

The tuber is rich in Cu, Fe, Mg and Ni. Beta-sitosterol, isolated from the tubers, exhibits significant anti-inflammatory activity against carrageenan- and cotton pellet-induced oedema in rats; the activity is comparable to hydrocortisone and phenylbutazone when administered intraperitoneally.

The alcoholic and aqueous extracts of the tubers possess lipolytic action and reduce obesity by releasing enhanced concentrations of biogenic amines from nerve terminals of the brain which suppress the appetite centre. Presence of eudalne group of sesquiterpenic compounds of sesquiterpene alcohol, isocyperol is said to play an important role in lipid metabolism.

An alcoholic extract of the plant exhibits liver-protective activity against CCL4-induced liver damage in mice.

Methanolic extract of the plant stimulates the production of melanin in cultured melanocytes. (Plant extract is used in preparations used for pigmentation of skin and hair, also in suntan gels.)

Aqueous-alcoholic extract of the tuber exhibited hypotensive, diuretic, antipyretic and analgesic activities. These are attributed to a triterpenoid.

The essential oil (0.5–0.9%) from the tubers contains mainly sesquiterpenes.

C. platystilis Br. is equated with Kaivarta-mustaka.

Dosage ► Rhizome—3–6 g powder; 20–30 ml decoction. (*API* Vol. III.)

Cyperus scariosus R.Br.

Family ► *Cyperaceae.*

Habitat ► Damp situations in Uttar Pradesh and eastern and southern parts of India.

English ► Nut grass.

Ayurvedic ► Bhadramustaa, Musta, Amoda, Naagaramustaka. (Naagara

C

is a different drug, equated with *Zingiber officinale* Rosc.)

Siddha ► Korai-kilangu (Tamil).

Folk ► Naagara-mothaa.

Action ► Essential oil—hypotensive, anti-inflammatory, CNS stimulant, antimicrobial. Rhizome—stomachic, cordial, antidiarrhoeal and diuretic.

See *C. rotundus.*

Cytisus scoparius (L.) Link.

Synonym ► *Sarothamnus scoparius* (L.) Koch.

Family ► *Papilionaceae, Fabaceae.*

Habitat ► Mild climatic regions of south and central Europe, north Africa and West Asia. *C. scoparius* is fairly common in and around Oatacmund (Nilgiris) and is found wild as a garden escape. It grows also in Simla and neighbouring places. An allied species, *C. monspessulanus* Linn., White Broom, also occurs in the Nilgiri hills.

English ► Broom, Scotch Broom, Yellow Broom.

Folk ► Broom.

Action ► Green twigs of the plant, collected before flowering, either fresh or after drying, are used as diuretic and cathartic. Emetic in large doses. The seeds are also used similarly. The herb is used chiefly in the form of sulphate in tachycardia and functional palpitation. (The action of the whole plant is stated to be different from that of isolated alkaloids.) The whole herb has been used to treat tumours.

Key application ► For functional heart and circulatory disorders. Aqueous-ethanolic extracts are used internally. Simultaneous administration of MAO-inhibitors contraindicated due to the tyramine content. (*German Commission E.*) *The British Herbal Pharmacopoeia* reported antiarrhythmic and diuretic action of the herb.

The herb contains quinolizidine alkaloids; main alkaloids are (−)-sparteine, lupanine, ammodendrine and various derivatives; biogenic amines, including tryramine, epinine, dopamine; isoflavone glycosides including genistein, scoparin; flavonoids; essential oil; caffeic acid and *p*-coumaric acids; tannins. Seeds contain lectins (phytohaemagglutinins).

The herb contains over 2% tyramine. Tyramine acts as an indirect sympathomimetic, vasoconstrictive and hypotensive.

The herb is contraindicated in high blood pressure, A-V block and pregnancy.

Scoparin's action on renal mucous membrane is similar to that of Buchu and Uva-ursi. (A decoction or infusion of broom is used in dropsical complaints of cardiac origin.)

Sparteine produces a transient rise in arterial pressure followed by a longer

period of decreased vascular tension (contradictory observations have been recorded). Some researchers are of the opinion that sparteine is a regulator in chronic vulvar disease. It showed no cumulative action like digitalis. In large doses, it is highly toxic and impairs the activity of respiratory organs.

C. monopessulanus (a related species) contains. 9% alkaloids.

Sparteine is toxic at more than 300 mg dose. (Francis Brinker.)

D

Dactyloctenium aegyptium Beauv.

Synonym ► *Eleusine aegyptiaca* Desf.

Family ► *Gramineae, Poaceae.*

Habitat ► Common throughout the plains of India (a very variable grass).

Ayurvedic ► Takraa, Takraahvaa, Panchaanguli, Nrityakaundaka. (Classical synonyms.) (Takra is the classical name of buttermilk.)

Folk ► Makaraa, Makari (Bihar, Orissa), Timidaa (Tamil Nadu)

Action ► Astringent, bitter tonic, anthelmintic. Used for polyurea; externally for wounds and ulcers.

The grass growing is New South Wales is reported to contain cyanogenetic glycosides.

In Indian medicine, the grass is used for imparting medicinial properties of Takra (buttermilk) in intestinal, biliary and urinary diseases.

Daemonorops draco Blume.

Synonym ► *Calamus draco* Willd.

Family ► *Palmae; Aracaceae.*

Habitat ► Indo-Malayan region. The resin is imported into India mostly from Sumatra and Borneo.

English ► East Indian Dragon's Blood.

Ayurvedic ► Raktaniryaas, Khoonkharaabaa, Heeraadokhi.

Unani ► Damm-ul-Akhwain.

Action ► Astringent. Used for diarrhoea, dysentery. Also used against malignant tumours.

The resin contains red tannin derivatives—drocoresinotannols, dracoresen and flavone quinones.

Dosage ► Resin—1–3 g. (*CCRAS.*)

Daemonorops jenkinsianus Mart.

Synonym ► *Calamus jenkinsianus* Griff.

Family ► *Palmae; Aracaceae.*

Habitat ► Assam, Khasi Hills and Sikkim.

Ayurvedic ► Vetra (related species of *Calamus tenuis* Roxb.)

Action ► Used as a vegetable for oedema, also in intrinsic haemorrhage.

Dalbergia lanceolaria Linn.f.

Synonym ► *D. frondosa* Roxb.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► The sub-Himalayan tract, ascending up to 750 m, and throughout India.

Siddha/Tamil ► Erigai, Navelangu.

Folk ► Gorakh, Takoli, Bithuaa.

Action ► A decoction of bark—used in dyspepsia. Oil—applied to rheumatic affections, and cutaneous diseases. Leaf—in leprosy and allied obstinate skin diseases.

Baptigenin from leaves and flowers possesses properties to treat arthritic affections and inflammations. An isoflavone glycoside of biochanin (lanceolarin) has been obtained from the root bark. Ether, EtOH and aqueous extract of leaves exhibited antiarthritic activity in rats.

The heartwood of *Dalbergia* sp. contains quinones. Bark and pods contain tannins.

Root bark gave isoflavone glycosides and lanceolarin.

Dosage ► Whole plant—50–100 ml decoction. (*CCRAS.*)

Dalbergia latifolia Roxb.

Synonym ► *D. emerginata* Roxb.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Bengal, Bihar, Madhya Pradesh and Western Peninsula.

English ► East Indian Rosewood, Bombay Blackwood.

Ayurvedic ► Shimshapaa (related sp.)

Unani ► Sheesham.

Siddha/Tamil ► Itti, Eravadi, Karundoroiral.

Folk ► Sisu.

Action ► Stimulant, appetiser, anthelmintic, spasmogenic. Used in dyspepsia, diarrhoea; also in obesity, cutaneous affections and leprosy.

The bark contains hentriacontane, latifolin, beta-sitosterol and tannins. EtOH (50%) extract of the bark exhibits spasmogenic, and anthelmintic activity against *Ascaridia galli.*

Dalbergia sissoides Grah.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout India, especially in the South.

English ► Malabar Blackwood.

Ayurvedic ► Kushimshapaa. (Shimshapaa related species).

Siddha/Tamil ► Vel-itti.

Folk ► Sisam.

Action ► Anti-inflammatory.

The root contains isoflavones. The alcoholic extract of the root exhibited anti-inflammatory activity in carrageenan-induced hind paw oedema of male albino rats.

A quinone, sissoidenone and dalbergion, latifolin and dalbergin have been isolated from the heartwood; also oleanolic acid, liquiritigenin and isoliquiritigenin. The sapwood and young leaves gave sissotrin. Biochanin A, isolated from young leaves, inhibited both serum and epidermal growth factor (EGF)—stimulated growth of human prostate cancer cell lines.

Dalbergia sissoo Roxb ex DC.

Family ► *Papilionaceae; Fabaceae.*

Habitat ▶ The sub-Himalayan tract, up to 1,200 m from Indus to Assam and in plains throughout India.

English ▶ Sissoo, South Indian Redwood, Sissoo.

Ayurvedic ▶ Shimshapaa, Krishna-shimshapaa, Picchilaa.

Unani ▶ Seesham.

Siddha/Tamil ▶ Irupoolai.

Action ▶ Leaves—bitter, and stimulant. Leaf mucilage, mixed with sweet oil, is applied to excoriations. Wood—anthelmintic, alterative, emetic, stomachic, antileprotic; used in diseases due to vitiated blood. Bark—anticholerin. Root—astringent.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the heartwood in turbity of the urine, calculus and lipuria.

The leaves gave isoflavone sissotrin; flowers 7,4′-di-Me-tectorigenin. Seed oil (4.1%) contained fatty acids composed of palmitic (16.2), stearic (7.0%), oleic (14.6), linolenic (9.80) and linoleic (52.5) acids and lipids comprising neutral lipids (88.5), glycolipids (7.2) and phospholipids (4.0%). Pods contain 2% tannins.

Dosage ▶ Heartwood—1.5–10 g powder; 10–20 g for decoction. (*API* Vol. III.)

Dalbergia sympathetica Nimmo ex Grah.

Synonym ▶ *D. multiflora* Heyne ex Prain.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Common in Maharashtra and Karnataka.

Folk ▶ Tibali (Goa), Pentagul (Maharashtra).

Action ▶ Bark—used as a paste for pimples. Leaf—alterative. Aerial part—spasmolytic, CNS active, hypothermic.

Dalbergia volubilis Roxb.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Central and Eastern Himalayas, Uttar Pradesh and Orissa.

Ayurvedic ▶ Gorakhi.

Siddha/Tamil ▶ Punali.

Folk ▶ Bankharaa, Bhatiaa.

Action ▶ Leaves—used in aphthae. Root—genitourinary tract disinfectant; used in scalding of urine, also in foetid discharges.

The stem bark afforded isoflavonoids, dalbergio, tectorigenin. The leaves gave flavonoid glycosides. The wood gave friedelin.

Daphne oleoides Schreb.

Family ▶ *Thymelaeaceae.*

Habitat ▶ The Western Himalayas and Kashmir at 1,000–3,000 m.

English ▶ Mezereon.

Folk ▶ Kutilal, Kanthan (Punjab).

D

Action ► Active principles are attracting scientific interest. The orthoesters are co-carcinogenic and mezerein antileukaemic in experimental studies. Bark—used as an ointment for inducing discharge from indolent ulcers. Bark, root and root bark—used mainly for obstinate cutaneous diseases, especially for eczema with severe itching and copious exudation (weeping eczema).

As the plant is poisonous, it is used in homoeopathic dilutions internally and topically.

The bark gave diterpenes including mezerein, daphnetoxin (0.02%). Mezerein is anti-inflammatory and anticarcinogenic. Daphnetoxin is poisonous. Seeds contain daphnane ester (0.1%) and daphnetoxin (0.02%).

EtOH extract showed significant activity against P-388 lymphocytic leukemia and L-1210 leukemia in mice, due to mezerein.

Datisca cannabina Linn.

Family ► *Datiscaceae.*

Habitat ► Temperate and subtropical Himalaya from Kashmir to Nepal at 300–1,800 m.

English ► False Hemp.

Folk ► Akal-ber. Bhang-jala (Punjab).

Action ► Diuretic, purgative, expectorant. Used in fevers, and gastric and scrofulous ailments.

The plant contains flavonoids, datiscin and datiscanin. EtOH (50%) extract of seeds and flowers exhibited marked sedative, highly anti-inflammatory, mild analgesic, antipyretic and diuretic activity in rats.

Datura alba Nees.

Family ► *Solanaceae.*

Habitat ► Throughout India in plains; wastelands, roadsides and gardens.

Ayurvedic ► Dhattuura (white var.). (Dhattura consists of dried seeds of *Datura* sp.)

Unani ► Dhaturaa.

Action ► See *D. Metel* Linn.

Datura innoxia Mill.

Synonym ► *D. metel* auct. non Linn.

Family ► *Solanaceae.*

Habitat ► Western Himalayas and hilly regions of the western parts of Peninsular India, abundantly in Maharashtra.

English ► Thornapple.

Ayurvedic ► Dhattuura.

Unani ► Dhaturaa, Joz Maasil.

Action ► The plant is the source of alkaloid scopolamine which is used as a pre-anaesthetic in surgery and childbirth, in ophthalmology and for the prevention of motion sickness.

Hyoscyamine and hyoscine and meteloidine were found in the leaves, flowers, pericarp and seeds of the plant. The

root gave tropane, tropine and pseudotropine.

Datura metel Linn.

Synonym ▶ *D. fastuosa* Linn.

Family ▶ *Solanaceae.*

Habitat ▶ Throughout India, particularly in waste place.

English ▶ Thornapple, Downy Datura.

Ayurvedic ▶ Dhattuura, Dhuurta, Dhastura, Unmatta, Shivapriya, Harapriya, Hema, Haatta, Dhustuura, Dhustuuraka, Kanaka, Maatula. Also equated with Raaj-dhatuura. (white var.)

Unani ▶ Dhaturaa.

Siddha/Tamil ▶ Oomatthai, Karuvoomatthai.

Action ▶ Various plant parts are used in headache, hemiplegia, epilepsy, delirium, convulsions, cramps, rigid thigh muscles, rheumatism. Leaf—antitumour, antirheumatic. Leaf and corolla—anti-inflammatory. Flower—antiasthmatic. Seed, leaf and root—anticatarrhal, febrifuge, antidiarrhoeal, antidermatosis; also used in cerebral complications. Seeds—used in asthma. Limited use in kinetosis (excessive salivation, nausea and vomiting).

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the whole plant in dysuria and alopecia.

The plant accumulates more hyoscine than hyoscyamine. Hyoscine content of dried leaves and flowering tops—between 0.02–0.55%. Alkaloid content of leaves—0.55%; stem—0.4%; seeds—0.19%; pericarps—0.8%; root at flowering of the plant—0.77%.

Hyoscine in large doses causes delirium and coma.

Dosage ▶ Seed—30–60 mg. (*API* Vol. III.)

Datura stramonium Linn.

Synonym ▶ *D. tatula* Linn.

Family ▶ *Solanaceae.*

Habitat ▶ The Himalaya from Kashmir to Sikkim up to 2,700 m, hilly districts of Central and South India.

English ▶ Thornapple, Jimsonweed, Stramonium.

Ayurvedic ▶ Krishnadhattuura, Dhuurta (black seed var.), Unmatta, Kitav, Tuuri, Maatul, Madan.

Unani ▶ Dhaturaa.

Action ▶ Spasmolytic, antiasthmatic, anticholinergic, cerebral depressant, nerve-sedative. Controls spasms of bronchioles in asthma. Anticholinergic. Effects of overdose are similar to those of atropine. Temporary relief from Parkinsonian tremor recorded. (Contraindicated with depressant drugs.) Applied locally, stramonium palliates the pain of muscular rheumatism, neuralgia, also pain due to haemorrhoids, fistula, abscesses and similar inflammations. Prevents motion sickness.

D

Key application ► In diseases of the autonomic nervous system. (Included among unapproved herbs by *German Commission E.) The British Herbal Pharmacopoeia* reported antispasmodic action of the leaf; *Indian Herbal Pharmacopoeia* accepted it as expectorant and antispasmodic.

Whole plant contains 0.26% alkaloids (seeds 0.98% and stem 0.08%); also flavonoids, withanolides, coumarins and tannins; the major alkaloid is hyoscyamine (44–67%), hyoscine (13.2–25.3%) and atropine (0.01–0.1%). The tropane alkaloids are similar to those found in *Atropa belladonna.*

Hyoscine is five times as active as atropine in producing mydriasis, but its main use is as antimotion sickness drug; and in combination as a sedative.

Toxic constituents include anticholinergic alkaloids.

Dosage ► Leaf—60–185 mg powder; seed—60–120 mg powder (*CCRAS.*)

Daucus carota Linn. var. sativa DC.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Europe and the Mediterranean region; extensively cultivated in Punjab, Haryana, Uttar Pradesh and Madhya Pradesh for its fleshy tap roots which are eaten raw or cooked. Wild Carrot: Native to Europe, Africa and Asia. Grows at 3,000–3,600 m in the Himalayas.

English ► Carrot, Cultivated Carrot. Wild carrot (D. carota Linn.wild var.: the root, small and white), Queen Anne's Lace, Bird's Nest. Bees' Nest Plant.

Ayurvedic ► Gaajara, Garjara, Granjana.

Unani ► Gaajar.

Action ► Roasted roots—prescribed in palpitation, burning micturation, cough and bronchitis. Carrot increases the quantity of urine and helps the elimination of uric acid; also lowers blood sugar. Juice—a rich source of carotene. Seeds—diuretic, emmenagogue, spasmolytic (prescribed in anuria and sexual debility). Wild carrot—diuretic and antilithic (used for kidney stones, cystitis and in gout). Seeds—emmenagogue. Also used for hot flushes of the menopause.

In cooked (orange) carrots beta-carotene content (1890 mcg) was found much higher than in raw carrots-(1045 mcg/100 g). Heat processing of carrots affected alpha- and beta-carotene contents; their value decreased (3.7; 5.3) in water blanching, whereas increased (5.8; 8.2) in steam blanching compared to that in fresh carrots (5.2; 8.1 mg/100 g) respectively.

An interferon inducer has been isolated from carrot. It stimulates cells to produce the protein that increases human resistance to virus infections.

Aqueous extract of carrots showed hepatoprotective activity against CCl4-induced hepatic damage in mice liver.

The ethanolic extract exhibits direct relaxant action on cardiac and smooth muscle preparation and this action may be responsible for its hypotensive

action. (Gently heated peeled roots, mixed with sugar candy, are given as a hypotensive drug.)

The ethanolic extract of seeds exhibited diuretic effect in dogs.

The British Herbal Pharmacopoeia recommends Daucus carota Linn. (wild carrot) for its diuretic activity. Wild carrot contains flavones including apigenin, chypsin, luteolin; flavonols including kaempferol, quercetin and various glycosides. The furanocoumarins, 8-methoxypsoralen and 5-methoxypsoralen are found in the plant. The seed oil contains terpinen-4-ol, a renal irritant. It is believed to cause diuretic activity.

Decalepis hamiltonii Wight & Arn.

Family ▶ *Asclepiadaceae.*

Habitat ▶ Deccan Peninsula; common in the forest areas of Western Ghats.

Unani ▶ Desi Ushbaa.

Siddha/Tamil ▶ Mahali kizhangu.

Action ▶ Root—appetizer, blood purifier, bacteriostatic. Used as a substitute for Shveta Saarivaa (*Hemidesmus indicus*). Sold as Saarivaa in Kerala, Tamil Nadu and Karnataka. The root powder is given to diabetics.

The root contains quercetin, kaempferol, coumarin and rutin. It has a sweet sarsaparilla-like taste; contains 92% fleshy matter and 8% woody core.

The root can be stored for longer periods and remains unaffected by microorganisms and insects, apparently due to the presence of the volatile principle which possesses bacteriostatic and toxic properties.

The root, on steam distillation, gave 4-O-methyl-resorcylaldehyde in a concentration of 0.8%. (The growth of *E. coli* was arrested by the aldehyde in 0.041% concentration; fish died within 4 min in 0.02% solution.) The sterols consists mainly of stagma and brassica sterols. Alpha-amyrin and lupeol, both free and as esters are also present in the root.

The plant contains lupeol, beta-amyrin 2-hydroxy, 4-methoxy benzaldehyde, and ferulic acid.

Delima scandens Burkill.

Synonym ▶ *Tetracera scandens* Merrill.

Family ▶ *Dilleniaceae.*

Habitat ▶ Forests of Bengal, Assam and the Andamans.

Ayurvedic ▶ Paaniya Valli.

Action ▶ A decoction of the plant is given in dysentery and coughs. Leaves—used for the treatment of boils. Root—astringent, used as external application for burns.

Delonix regia Rafin.

Synonym ▶ *Poinciana regai* Bojer ex Hook.

Family ▶ *Caesalpiniaceae.*

Habitat ▶ Native to Madagascar; grown in gardens and avenues for ornamental purposes and for shade.

D

English ► Flamboyant Flame tree, Gold Mohur.

Ayurvedic ► Gulmohar (var.) White Gold Mohur is equated with *Delonix elata* Gamble, synonym *Poinciana elata* Linn.

Siddha ► Vadanarayana, Perungondrai, Mayarum. White Gulmohar. (Tamil)

Action ► Bark—antiperiodic, febrifuge. Plant—antirheumatic, spasmogenic. Flowers (aqueous and alcoholic extract)—active against roundworm.

White Gulmohar trunk-bark yielded asparagine and aspartic acid. Flowers gave *iso*-quercetin.

Delonix regia bark gave leucocyanidin; bark and leaves contain tannin, lupeol and beta-sitosterol, and free OH-proline as major amino acid. Flower anthers are a rich source of zeaxanthin.

Delphinium brunonianum Royle.

Family ► *Ranunculaceae.*

Habitat ► Native to China; distributed in West Himalayas.

English ► Musk Larkspur.

Ayurvedic ► Sprikkaa. (*Melilotus officinalis,* known as Aspurka or Naakhunaa, is also equated with Sprikkaa.) Used as a substitute for Tagara (valerian).

Action ► Himalayan species act as cardiac and respiratory depressant. All the species of Delphinium are poisonous; find use in indigenous medicine for destroying maggots in wounds, particularly in sheep. The flowers are considered acrid, bitter and astringent; seeds are cathartic, anthelmintic, emetic and insecticidal.

Delphinium cashmirianum Royle.

Family ► *Ranunculaceae.*

Habitat ► Kashmir (Himalayan species).

English ► Kashmir Larkspur.

Ayurvedic ► Used as a substitute for Tagara (valerian).

Action ► See *D. brunonianum.*

Delphinium consolida Linn.

Synonym ► *D. ajacis* Linn.

Family ► *Ranunculaceae.*

Habitat ► Cultivated in gardens.

English ► Forking Larkspur, Larkspur, Lark's Claw, Knight's Spur.

Action ► Parasiticide. A tincture is used to destroy lice in hair.

The toxicity of the seeds is due to diterpene alkaloids (delcosine, delsoline, consolidine). Delsonine and anthranoyllycoctonine are amorphous alkaloids.

The alkaloids lead to bradycardia, lowering of blood pressure, and cardiac arrest. Also, they have a central paralyzing and curare-like effect on the respiratory system. (*German Commission E.*)

Entire plant, including roots and seeds, is used topically. Not to be used on abraded skin.

Seeds contain 1.01–1.06% alkaloids and 28.7% of a fixed oil. A diglycoside pigment, delphonin and kaempferol have been isolated from the flowers.

Delphinium denudatum Wall.

Synonym ► *D. pauciflorum* Royle.

Family ► *Ranunculaceae.*

Habitat ► The temperate Himalayas from Kashmir to Kumaon at altitudes of 2,400–3,600 m.

English ► Larkspur.

Ayurvedic ► Nirvishaa, Nirvishi. (*Kyllinga triceps* Rottb. is used as a substitute for Nirvishaa.)

Unani ► Jadwaar Khataai, Maatiryaaq.

Folk ► Root—astringent, vulnerary, deobstruent, alterative. Used for painful piles, muscular atrophy, gout and as a nervine tonic. Also used as an adulterant for aconite.

Oral administration of the aqueous extract of the plant to rats with CCl4-induced hepatotoxicity revealed hepatoprotective property of the plant.

The roots contain campesterol, stigmasterol, sitosterol, cholesterol, delta-avenasterol and alkaloids including denudatine, denudatidine, condelphine, talatizidine and iso-talatizidine.

Delphinium staphisagria Linn.

Family ► *Ranunculaceae.*

Habitat ► Native to Mediterranean region.

English ► Stavesacre.

Unani ► Muvizaj.

Action ► Parasiticide. Used for destroying lice. Contains poisonous alkaloids. Seeds are violently emetic and cathartic; used as an external application in obstinate skin diseases and eruptions under medical supervision.

Seeds contain diterpene alkaloids; delphidine, delphinine, delphirine, delphisine and neoline.

Stavesacre has a similar effect to aconitine. Extract from the seeds is used in homoeopathic dilutions.

Delphinium vestitium Wall. ex Royle.

Synonym ► *Delphinium elatum* auct. non Linn.
D. speciosum Janka ex Nym.

Family ► *Ranunculaceae.*

Habitat ► The temperate Himalaya from Kashmir to Nepal to 2,700–4,700 m.

English ► Candle Larkspur, Bee Larkspur.

Ayurvedic ► Nirvisha.

Action ► Whole plant—cardiac and respiratory depressant, emetic, diuretic, anthelmintic. Seed—insecticidal. Used in skin eruptions. Powdered flowers, mixed with mustard oil, are used for destroying lica.

D

The plant contains beta-sitosterol and alkaloid delpheline; aerial parts contain an alkaloid, elatine.

Seeds are very poisonous; contain several aconitine-like alkaloids. Delphinidine, isolated from seeds, causes drastic gastro-enteric irritation.

Delphinium zalil Aitch. & Hemsl.

Synonym ► *D. semibarbatum* Blenert ex Boiss.

Family ► *Ranunculaceae.*

Habitat ► Persia and Afghanistan.

English ► Zalil Larkspur.

Ayurvedic ► Sprikkaa. (*Melilotus officinalis,* known as Aspurka or Naakhunaa, is also equated with Sprikkaa.)

Unani ► Zarir, Zalil, Asbarg, Gul-Zalil (flower).

Action ► Diuretic, anodyne, anti-inflammatory, detergent. Used in jaundice, dropsy and diseases of the spleen. Ash—used externally on wounds and skin diseases.

The seeds contain norditerpenoid alkaloid, zaliline, besides anhweidelphinine, browniine, desacetylnudicauline, lycoctonine, methyllycaconitine and nudicauline. The medicinal properties of the plant are attributed to desacetylnudicauline, methyllycaconitine and nudicauline.

Dendrobium ovatum (Willd.) Kranzl.

Family ► *Orchidaceae.*

Habitat ► The Western Ghats.

Ayurvedic ► Jivanti (substitute.)

Folk ► Nagli (Maharashtra)

Action ► Juice of fresh plant—stomachic, carminative, antispasmodic, laxative, liver tonic. (excites the bile). A related species, *Dendrobium crumenatum* Sw., occurs in Andaman Islands. Pounded leaves are used in Malaya for poulticing boils and pimples. Traces of alkaloids have been reported to be present in the pseudobulbs and leaves.

D. macraei Lindl. and *D. normale* Face. are also known as *Jivanti.*

Dendrophthoe falcata (Linn. f.) Etting.

Family ► *Loranthaceae.*

Habitat ► Throughout India.

Ayurvedic ► Bandaaka, Vrkshaadani, Vrkshruuhaa.

Siddha ► Pulluri, Plavithil (Tamil).

Folk ► Baandaa.

Action ► Bark—astringent and narcotic; used in menstrual disorders, consumption, asthma, also for treating wounds.

The plant contains several flavonoids. Being parasitic, different flavonoids have been recorded in plants growing on different host plants. Quercitrin has been found to be the major common constituent. The plant also contains gallic, ellagic and chebulinic acids.

Aqueous and alcoholic extracts of the plant were tested in rats for their diuretic and anti-lithiatic activities. Alcoholic extract was found to be more effective than aqueous extract.

Dosage ► Leaf, flower—10–20 ml juice. (*CCRAS.*)

Derris indica (Lamk.) Bennet.

Synonym ► *Pongamia pinnata* Pierre.

Family ► *Fabaceae.*

Habitat ► Native to the Western Ghats. Found all over India on the banks of rivers and streams.

English ► Indian Beech. Pongamia oil tree.

Ayurvedic ► Naktmaal, Guchpushpak, Ghritpuur, Udkirya, Karanja.

Siddha/Tamil ► Pungu.

Action ► Used for skin diseases—eczema, scabies, leprosy, and for ulcers, tumours, piles, enlargement of spleen, vaginal and urinary discharges. Juice of root—used for closing fistulous sores and cleaning foul ulcers. Flowers—used in diabetes. Powder of seeds—used for whooping and irritating coughs of children. Seed oil—used in cutaneous affections, herpes and scabies.

The tree is rich in flavonoids and related compounds. These include simple flavones, furanoflavonoids, chromenoflavones, chromenochalcones, coumarones, flavone glucosides, sterols, triterpenes and a modified phenylalanine dipeptide.

Essential oil from leaves—antibacterial, antifungal.

Dosage ► Bark—50–100 ml decoction; leaf—10–20 ml juice. (*CCRAS.*)

Derris uliginosa Benth.

Synonym ► *D. trifoliate* Lour.

Family ► *Fabaceae.*

Habitat ► Costal forests of India and the Andamans.

Folk ► Paan-lataa (Bengal), Kitani (Maharashtra).

Action ► Stimulant, antispasmodic, counter-irritant. Bark—alterative in rheumatism. An oil prepared from the plant is used externally as an embrocation.

The roots contain dehydrorotenone, lupeol and a ketone. Bark contains 9.3% tannic acid. Stems contain tannic acid, hexoic, arachidic and stearic acids, ceryl alcohol, isomerides of cholesterol, potassium nitrate, gums and resins.

Descurainia sophia (Linn.) Webb ex Prantl.

Synonym ► *Sisymbrium sophia* L.

Family ► *Brassicaceae.*

Habitat ► Temperate Himalaya from Kashmir to Kumaon at 2,200–4,100, also in eastern Himalaya.

English ► Flix Weed, Flax Weed.

Folk ► Khaakasi, Khuubkalaan.

D

Action ► Leaf and flower—astringent, antiscorbutic. Seed—expectorant, anti-inflammatory, febrifuge, antidysenteric. Aerial parts—antiviral, hypoglycaemic.

The plants has been used externally for ulcers, seeds are used as substitute or adulterant of the seeds of *Sisymbrium iro* Linn. (The source of Khaakasi, Khubb, Tukhm-e-Shahuh, Khuubkalaan of Unani medicine, known as Hedge Mustard or London Rocket.)

Desmodium gangeticum DC.

Synonym ► *Hedysarum gangeticum* Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Ascending to 1,500 m on the Himalaya; common on lower hills and plains throughout India.

Ayurvedic ► Shaaliparni, Shaalaparni, Sthiraa, Somyaa, Guhaa, Triparni, Vidaarigandha, Anshumati. Also used as Prshniparni. (*Uraria picta* Desv., Prshniparni, is used as a substitute for Shaalaparni.)

Siddha/Tamil ► Pulladi, Sirupulladi Moovilai (root).

Folk ► Sarivan.

Action ► Root—antipyretic, diuretic, astringent (used in irritable bowel syndrome, diarrhoea and dysentery), anticatarrhal (used in post-natal care, chronic fever, cough, biliousness, vomiting), diuretic, anthelmintic, laxative and nervine tonic. *Desmodium* spp.: Roots—carminative, mildly purgative, stomachic, emmenagogue, diuretic. Leaves—galactagogue; a poultice of leaves is used for lumbago. Bark—used in diarrhoea and haemorrhages.

Roots afforded pterocarpanoids—gangetin, gangetinin, desmodin and several alkaloids. The aerial portion gave indole-3-alkylamines and their derivatives.

Gangetin showed significant anti-inflammatory activity in 50 and 100 mg/kg p.o. in rats.

Dosage ► Root—5–10 g powder; 10–20 g for decoction. (*API* Vol. III.)

Desmodium triflorum (Linn.) DC.

Synonym ► *Hedysarum triflorum* Linn.

Family ► *Fabaceae.*

Habitat ► Throughout India, in the plains ascending to 1,200 m in Kumaon and 1,800 m in Kashmir.

Ayurvedic ► Tripaadi, Hamsapaadi (Kerala).

Siddha/Tamil ► Seruppadi.

Folk ► Jangali Methi, Ran-methi.

Action ► Fresh leaves—used internally as galactagogue and for diarrhoea; applied externally to wounds and abscesses. Root—diuretic. Also used for cough, asthma.

The leaf contains alkaloids (0.01–0.15%), major being beta-phenylethyl-

amine; also contains tyramine and hypaphorine. Hypaphorine is present in roots as well. Root contains 0.01–0.02% alkaloids.

Desmostachya bipinnata Stapf.

Synonym ► Eragrostis cynosuroides Beauv.

Family ► *Gramineae; Poaceae.*

Habitat ► Throughout the plains of India in dry and hot areas and in sandy deserts.

English ► Sacrificial Grass (smaller var.)

Ayurvedic ► Kusha, Suuchyagra, Yagyabhuushana, Kshurapatra.

Siddha/Tamil ► Tharubai.

Action ► Root—cooling, diuretic, galactagogue, astringent. Used for urinary calculi, and other diseases of the bladder. Clums—used in menorrhagia, dysentery, diarrhoea and in skin diseases.
The Ayurvedic Pharmacopoeia of India recommended the use of the rootstock in dysuria, vaginal discharges and erysipelas.

Dosage ► Rootstock—50–100 g for decoction. (*API* Vol. III.)

Dianthus carophyllus Linn.

Family ► *Caryophyllaceae.*

Habitat ► Kashmir; commonly grown in gardens, especially on the hills.

English ► Carnation, Clove Pink.

Action ► Flowers—diaphoretic, alexiteric, cardiac tonic. whole plant—vermifuge. Juice of plant—antiviral.

Leaves contain glucoproteins.

A related species, *Dicentra anatolicus* Boiss, found in the Western Himalayas, is used as an antiperiodic in intermittent fevers.

Dicentra canadensis Walp.

Family ► *Papaveraceae.*

Habitat ► The Himalayas from Kumaon to Khasia Hills. Cultivated in Indian gardens.

English ► Squirrel Corn. (A related species, *Corydalis cucullaria,* known as Turkey Pea, occurs in Canada and the USA.)

Action ► Diuretic, alterative, antiscrofula. Used for torpid and sluggish conditions, menstrual disorders and diseases due to vitiated blood. Also employed as a sedative for the relief of paralysis agitans and other muscular tremors.

A large number of physiologically active isoquinoline alkaloids have been isolated from the tubers of many species of *Dicentra,* but the use of Corydalis is not linked with the alkaloids they contain, only bulbocapnine, present in the tubers, exhibits therapeutic activity. It produces catalepsy in mammals and possesses sympathetic as well as parasympathetic central effects.

D

It has been employed for the relief of paralysis agitans and other muscular tremors, vesticular nystagmus and similar conditions.

The root contains protopine, corydeline, bulbocapnine, cancentrine, dehydrocancentrines A and B. Bicuculline (an isoquinoline alkaloid) isolated from the tuber of Dicentra cucullaria, is a centrally-acting, spasmogenic antagonist of GABA.

Dichroa febrifuga Lour.

Family ► *Saxifragaceae.*

Habitat ► The temperate Himalayas from Nepal to Bhutan and Khasi Hills.

Folk ► Basak.

Action ► Febrifuge, antipyretic, antiparasitic (used for malarial fever). Dried roots, known as Chang Shan, dried leafy tops, known as Shu Chi, in Chinese medicine, are used for malarial fever. Dried roots (Chang Shan) contain the alkaloid dichroine A and B, dichrin A and B.

The active principle febrifugine compared to quinine was estimated to be 16 to 64 times more efficacious against *Plasmodium gallinaceum* in chicks, about 100 times against *Plasmodium lophurae* in ducks also against *Plasmodium relictum* in canaries. The aqueous extract of the plant inhibited the infecting rate of the parasite *Plasmodium berghei* up to 10 days and increased the mean survival time to twice that of untreated control at 2.5 g/kg dose.

Clinical trials with febrifugine indicated that the drug given in four oral doses totalling 2–5 mg/day reduces the parasite count.

Dichrostachys cinerea W. & A.

Synonym ► Cailliea cinerea Macb.

Family ► *Mimosaceae.*

Habitat ► Northwestern and Central India, Maharashtra, from North Karnataka southwards.

Ayurvedic ► Virataru, Vellantaru, Viravrksha.

Siddha/Tamil ► Vidathalai.

Folk ► Varatuli, Khairi.

Action ► Root—astringent and diuretic; used in renal affections, urinary calculi, also in rheumatism. Tender shoots—applied externally for ophthalmia.

The plant foliage contain tannin—2.40, 5.60 and 4.40 mg/100 g during February, June and November respectively. Roots afforded *n*-octacosanol, beta-amyrin, friedelan-3-one, friedelan-3-beta-ol and beta-sitosterol. Flowers contain cyanidin and quercetin.

Dosage ► Root, bark—50–100 ml decoction. (*CCRAS.*)

Dicoma tomentosa Cass.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Africa and Asia, found in north-western and southern India.

Folk ► Navananji (Maharashtra), Vajradanti (Punjab).

Action ► Febrifuge (used in febrile attacks after childbirth. Applied locally to putrescent wounds.

In Indian medicine, Vajradanti, equated with *Potentilla arbuscula* D. Don and its related species (*Rosaceae*), is used topically for strengthening gums and teeth.

Dictamnus albus Linn.

Family ► *Rutaceae.*

Habitat ► Western Himalayas from Kashmir to Kunawar, common in Pangi.

English ► Gas Plant, Dittany, Burning Bush.

Action ► Root bark—used in nervous diseases, hysteria, intermittent fevers, urinogenital disorders, and amenorrhoea; a decoction for scabies and other skin affections. Toxic.

Dittany stimulates the muscles of the uterus, while its effect on the gastro-intestinal tract is antispasmodic, it relaxes the gut. (The plant is used in Greek folk medicine as antispasmodic.) The herb contains furoquinoline alkaloids (including dictamnine), furococumarins, limonoids, and flavonoids (including rutin).

Volatile oil contains estragol, anethole, and a toxic alkaloid dictamnine. Flowers yield 0.05% essential oil containing methylchavicol and anethole. Leaves yield 0.15% essential oil.

Didymocarpus pedicellata R.Br.

Synonym ► *D. macrophylla* auct. non-Wall. ex D. Don.

Family ► Gesneriaceae.

Habitat ► Sub-tropical Himalaya from Himachal Pradesh to Arunachal Pradesh at 500–2,500 m.

Ayurvedic ► Kshudra-Paashaana-bheda, Shilaa-valkaa, Shilaa-pushpa.

Action ► Leaf—antilithic. Used for stones in kidney and bladder.

The leaves contain a number of chalcones, quinochalcones and flavanones. Pediflavone has also been isolated from young leaves.

Digera muricata (Linn.) Mart.

Synonym ► *D. arvensis* Forsk. *Desmochaeta muricata* (L.) DC.

Family ► *Amaranthaceae.*

Habitat ► Throughout the plains of India, as a weed in cultivated fields.

Ayurvedic ► Katthinjara, Kunanjara.

Siddha/Tamil ► Thoyya-keerai.

Folk ► Lat-mahuriaa, Lahsuvaa.

Action ► Astringent, antibilious. Laxative in large doses. Flowers and seeds—diuretic; given for urinary discharges.

The plant contains alpha-and beta-spinasterol.

Digitalis lanata Ehrh.

Family ► *Scrophulariaceae.*

Habitat ► Native to Europe. Now cultivated mainly in Kashmir (Yarikhah), also occurs wild.

English ► Grecian Foxglove.

Ayurvedic ► Hritpatri, Tilapushpi (non-classical). (Yellow var.)

Action ► See *D. purpurea.*

Earlier, the herb was used to treat ulcers, boils, abscesses, headaches and paralysis. William Withering, an 18th century English country doctor, explored the plant's hidden properties. His work led to the production of digoxin, a life-saving medicine.

Safety of the herb cannot be established due to variable amounts of cardiac glycosides. The powder is toxic at 520 mg.

Digitalis purpurea Linn.

Family ► *Scrophulariaceae.*

Habitat ► Native to West Europe. Cultivated in Tangmarg and Kishtawar in Kashmir, Darjeeling and the Nilgiris.

English ► Digitalis, Foxglove.

Ayurvedic ► Hritpatri, Tilapushpi (non-classical). (Purple var.)

Action ► Main source of digoxin for the pharmaceutical industry. Digitalis glycosides increase the force of contraction of heart without increasing the oxygen consumption and slow the heart rate when auricular fibrillation is present. To be used only under strict medical supervision.

Not used as a herbal drug.

Dillenia indica Linn.

Synonym ► *Dillenia speciosa* Thunb.

Family ► *Dilleniaceae.*

Habitat ► The Himalayas from Nepal to Bhutan; north Bengal, Bihar, Orissa and Madhya Pradesh.

English ► Elephant Apple.

Ayurvedic ► Bhavya.

Folk ► Uva, Chaaltaa.

Action ► Fruit—laxative, carminative, bechic, febrifuge, antispasmodic (used for abdominal pains). Bark and leaves—astringent.

The sepals contain (on dry weight basis): tannin 0.37, glucose 2.92 and malic acid 0.51%. The bark and leaves contain about 10% and 9% tannin (on dry weight basis) respectively.

The fruit yielded a polysaccharide, arabingalactan.

The leaves yielded cycloartenone, *n*-hentriacontanol, betulin, betulinic acid and beta-sitosterol. The bark gave iso-rhamnetin, naringenin, quercetin derivatives and kaempferol.

Dillenia pentagyna Roxb.

Family ► *Dilleniaceae.*

Habitat ► The Himalayan terai from Punjab to Assam, and South India and the Andamans.

Folk ► Dillenia. Agai (Bihar), Agachi (Maharashtra).

Action ► See *D. indica.*

The bark contains 6% tannin.

Dioscorea alata Linn.

Synonym ► *D. atropurpurea* Roxb.
D. globosa Roxb.
D. purpurea Roxb.

Family ► *Dioscoreaceae.*

Habitat ► Native to East Asia; cultivated in Assam, Vadodara, Tamil Nadu, Bengal and Madhya Pradesh.

English ► Wild Yam, Greater Yam, Asiatic Yam.

Ayurvedic ► Kaashthaaluka. Aaluka (var.). Aalukas (yams) of Ayurvedic texts, belong to *Dioscorea* spp.

Siddha/Tamil ► Perumvalli kizhangu.

Folk ► Kathaalu.

Action ► Even the best among the cultivated yams causes irritation in the throat or a feeling of discomfort when eaten raw. Wild yams—cholagogue, antispasmodic, anti-inflammatory, antirheumatic, diuretic. Also used for painful periods, cramps and muscle tension.

Key application ► Dioscorea villosa L., Wild Yam—as spasmolytic, anti-inflammatory. (*The British Herbal Pharmacopoeia.*)

The edible tubers of *Dioscorea alata* are purple-coloured and contain anthocyanins, cyanidin and peonidin-3-gentiobioside acylated with sinapic acid. The tubers contain surcose, while leaves contain large quantities of D-fructose, D-glucose and the polyols, 2-deoxyribitol, 6-deoxysorbitol and glycerol.

Mouldy yams are reported to contain a compound ipomeanol which is being tested against human lung cancer. (*J. Am Med Assoc,* 1994, 15, 23.)

Diosgenin obtained from Dioscorea species was used in the first commercial production of oral contraceptives, topical hormones, systemic corticosteroids, androgens, estrogens, progestogens and other sex hormones.

The chemical transformation of diosgenin to estrogen, progesterone or any other steroidal compound does not occur in human body. Topically applied Wild Yam does not appear to cause changes in serum FSH, estradiol or progesterone. (*Natural Medicines Comprehensive Database,* 2007.)

Diosgenin, combined with the drug clofibrate, caused a greater decrease in LDL than either substance alone in rats. (Sharon M. Herr.)

Dioscorea anguina Roxb.

Synonym ► *D. puber* Blume.

Family ► *Dioscoreaceae.*

Habitat ► Wet regions of the Himalayas from Central Nepal, eastwards to northern Bengal, Assam and Chittagong.

Ayurvedic ► Kaasaalu, Kasaalu.

Folk ► Koshakanda (Bengal).

Action ► See *D. alata.*

Dioscorea bulbifera Linn.

Synonym ► *D. sativa* Thumb auct. non L.
D. versicolor Buch.-Ham ex Wall.

D

Family ▶ *Dioscoreaceae.*

Habitat ▶ Throughout tropical India, at 1,500–2,100 m.

English ▶ Patoto Yam, Bulb-bearing Yam, Air Potato, Dog Yam.

Ayurvedic ▶ Vaaraahi, Vaaraahikanda, Grshti, Banaaalu, Suraalu, Raktaalu. Substitute for Vriddhi.

Unani ▶ Baraahikand.

Siddha/Tamil ▶ Kodi-kilangu, Pannu-kilangu.

Action ▶ Dried and pounded tubers are used as an application for swellings, boils and ulcers; roasted tubers are used in dysentery, piles, venereal sores. Leaf—febrifuge.

The raw tubers are bitter due to the presence of furanoid norditerpenes (they lose their bitterness on roasting and are then eaten). The wild tubers contain nearly 83% starch and possess hunger-suppressing property. They contain certain poisonous alkaloids.

The rhizomes afforded D-sorbitol, furanoid norditerpenes—diosbulbins A-D, 2,4,6,7-tetrahydroxy-9,10-dihydrophenanthrene and 2,4,5,6,-tetrahydroxyphenanthrene, diosgenin, lucein, neoxanthine, violaxanthin, zeaxanthin, auroxanthin and cyrptoxanthin.

Dioscorea daemona Roxb.

Synonym ▶ *D. hispada* Dennst. *D. hirsuta* Dennst.

Family ▶ *Dioscoreaceae.*

Habitat ▶ Sikkim, the Himalayas, Khasi Hills.

Ayurvedic ▶ Hastyaaluka.

Siddha/Tamil ▶ Peiperendai.

Folk ▶ Karukandu, Kolo (Bihar).

Action ▶ Tubers—used for ulcer, to kill worms in wounds. Plant parts—used in whitlow, sores, boils.

The tubers contain 81.45–81.89% carbohydrates, 7.20–9.12% albuminoids. The toxic principle is dioscorine which is distributed throughout the plant.

Dioscorea deltoidea Wall ex Griseb.

Synonym ▶ *D. nepalensis* Sweet ex Bernardi.

Family ▶ *Dioscoreaceae.*

Habitat ▶ The Himalaya from Kashmir to Arunachal Pradesh and in Assam at 450–3,100 m.

Ayurvedic ▶ Vaaraahikanda (var.), Grishti.

Folk ▶ Gun, Kris (Punjab).

Action ▶ Tuber—antipthiriac. Leaf—febrifuge. The rhizomes are a rich source of diogenin and its glycoside. Steroidal saponins have also been isolated. Diogenin is used in the preparation of various steroidal drugs.

Dioscorea esculenta Burkill.

Synonym ▶ *D. aculeata* Linn. *D. faciculata* Roxb. *D. spinosa* Roxb ex Wall.

Family ► *Dioscoreaceae.*

Habitat ► Madhya Pradesh, Uttar Pradesh, Orissa, Bengal, Assam and the Andamans.

English ► Lesser Yam, Karen Potato.

Ayurvedic ► Madhvaaluka.

Siddha/Tamil ► Musilam, Valli kilangu, Siruvalli Kilangu.

Folk ► Suthani.

Action ► Tubers are starchy and free from dioscorine, contain 71.29% carbohydrates, 10.82% albuminoids.

Dioscorea glabra Roxb.

Family ► *Dioscoreaceae.*

Habitat ► Assam, Bengal, Bihar, Orissa and Andaman and Nicobar Islands.

Ayurvedic ► Shankhaaluka.

Action ► Tubers contain 77.79–78.23% carbohydrates, 9.73–10.13% albuninoids.

Dioscorea hamiltonii Hook. f.

Family ► *Dioscoreaceae.*

Habitat ► The Western Ghats, Sikkim, Assam, Orissa and Bengal.

Ayurvedic ► Vaaraahi (var.).

Folk ► Naagar-kanda (Bihar).

Action ► Tubers contain 85.50% carbohydrates, 8.30% albuminoids.

Dioscorea oppositifolia Linn.

Family ► *Dioscoreaceae.*

Habitat ► South India; throughout the hills of Deccan.

Ayurvedic ► Amlikaakanda (controversial synonym).

Siddha ► Kavala-kodi, Venilai Valli.

Folk ► Aambaalio Kanda (Gujarat).

Action ► Used externally for reducing swellings.

Dioscorea pentaphylla Linn.

Synonym ► *D. triphylla* var. *doemona* Prain & Burkill.

Family ► *Dioscoreaceae.*

Habitat ► Native to tropical Asia; distributed throughout India.

Ayurvedic ► Vaaraahikanda (var., dry pieces are sold as Vidaarikanda).

Folk ► Kaantaalu.

Action ► Tubers contain 71.07–80.77% carbohydrates, 8.68–15.93% albuminoids. Tubers are used to disperse swellings.

Dioscorea prazeri Prain & Burkill.

Synonym ► *D. Clarkei* Prain & Burkill *D. deltoidea* Wall. var. *sikkimensis* Prain

Family ► *Dioscoreaceae.*

Habitat ► The Himalaya from Nepal to Bhutan, up to 1,500 m, also in Naga Hills.

Ayurvedic ► Neelaalu.

Action ► Tuber—antiphthiriac.

D

The rhizomes are used as a hair wash for killing lice. They contain diogenin (on dry basis) 2.5%. Also obtained are steroidal sapogenins, sitosterol glucoside, prazerigenin-A glucoside, prazerigenin-A bioside and 9,10-dihydrophenanthrenes.

Diospyros ebenum Koenig.

Synonym ► *D. hebecarpa* A. Cunn ex Benth.

Family ► *Ebenaceae.*

Habitat ► Orissa and South India.

English ► Ebony Persimmon, Malabar Ebony, Ceylon Ebony.

Ayurvedic ► Tinduka.

Unani ► Aaabnuus.

Siddha/Tamil ► Acha-Thumbi.

Action ► Plant—astringent, attenuant, lithontriptic.

The heartwood contains 2 beta-naphthalhydes, 2 naphthoic acid derivatives; ceryl alcohol, betulin, alpha-amyrin, ursolic acid, baurenol and stigmasterol. The leaves contain ursolic acid, alpha-amyrin, betulin and lupeol.

Diospyros embryopteris Pers.

Synonym ► *D. peregrina* (Gaertn.) Gurke
D. malabarica (Desr.) Kostel.

Family ► *Ebenaceae.*

Habitat ► Throughout India in shady wet places and near streams.

English ► Gaub Persimmon, Riber Ebony.

Ayurvedic ► Tinduka, Tinduki, Sphurjaka, Kaalaskandha, Asitkaaraka. Nilasaara.

Unani ► Tendu.

Siddha/Tamil ► Tumbika, Kattatti.

Action ► Fruit and stem bark—astringent. Infusion of fruits—used as gargle in aphthae and sore throat. Fruit juice—used as application for wounds and ulcers. Oil of seeds—given in diarrhoea and dysentery. Ether extract of fruit—antibacterial. Bark—astringent and styptic, used in menorrhagia, diarrhoea, dysentery and intermittent fevers.

A paste is applied to boils and tumours. The ethyl acetate extract showed antistress and anti-ulcerogenic activity. It also prevented hepatotoxicity and leucocytosis in experimental animals.

The bark contains betulinic acid, myricyl alcohol, triterpenoids and saponin. The leaves gave beta-sitosterol, betulin and oleanolic acid. Fruit pulp and seeds contain lupeol, betulin, gallic acid, betulinic acid, hexacosane, hexacosanol, sitosterol, beta-D-glucoside of sitosterol and a triterpene ketone.

Stem bark—antiprotozoal, antiviral, hypoglycaemic, semen-coagulant. Stems yielded nonadecan-7-ol-one.

Dosage ► Bark—50–100 ml decoction. (*CCRAS.*)

Diospyros kaki Linn. f.

Family ► *Ebenaceae.*

Habitat ► Native to China; now grown in Himachal Pradesh, Kumaon, the Nilgiris and West Bengal for edible fruits.

English ► Japanese Persimmon.

Ayurvedic ► Tinduka (var.).

Action ► Hypotensive, hepatoprotective, antidote to poisons and bacterial toxins. Calyx and peduncle of fruit—used in the treatment of cough and dyspnoea. Roasted seeds—used as a substitute for coffee.

The fruit, in addition to sugars, glucose, fructose, ascorbic acid, citric acid, contains (% of fresh weight) 0.20–1.41 tannins, 0.21–10.07 total pectins, 0.67 pentosans and 0.16–0.25 polyphenols. The fruit also contains 2.4 mg/100 g carotenoids; carotene expressed as vitamin A 2200–2600 IU. The carotenoids identified in the pulp include cryptoxanthine, zeaxanthin, antheraxanthin, lycopene and beta-carotene. (Many carotenoids originally present in the fruit decompose during ripening.

The fruit pulp is an antidote to bacterial toxins and is used in the preparation of a vaccine for pertussis.

Condensed tannins from the fruits effectively inhibited 2-nitrofluorene mutagen.

The immature leaves contain a steroidal saponin, lignin and phenolic compounds. Eugenol and dihydroactinidiolide are reported from fresh leaves.

The leaves are reported to exhibit hepatoprotective activity. Leaves also contain hypotensive principles. Astragalin and isoquercitrin have been isolated from leaves.

Diospyros melanoxylon Roxb.

Synonym ► *D. dubia* Wall. ex A. DC.

Family ► *Ebenaceae.*

Habitat ► Madhya Pradesh, Maharashtra, Orissa, Bihar, Uttar Pradesh and West Peninsula.

English ► Coromandel Ebony, Persimmon.

Ayurvedic ► Tinduka (var.), Dirghapatrakaa.

Siddha/Tamil ► Karum Dumbi, Thumbi, Beedi-elai.

Action ► Leaves—carminative, laxative, diuretic, styptic. Bark—astringent. Used in dyspepsia and diarrhoea. Unripe fruit—carminative and astringent. Ripe fruit—antibilious. Dried flowers—used in anaemia, inflammation of spleen, also in leucorrhoea. Leaf and dried flower—used in dyspepsia and diarrhoea, topically in scabies. Aerial parts—hypotensive.

Half-ripe fruit contains 23, ripe fruit 15 and bark 19% tannin.

The bark and sapwood extracts yield beta-sitosterol, lupeol, betulin and betulinic acid. Leaves contain hentriacontane, hentriacontanol, alpha-amyrin, baurenol, ursolic, oleanolic and betulinic acids.

Diospyros montana Roxb. var. **cordifolia** Hiem.

Family ► *Ebenaceae.*

D

Habitat ▶ Throughout the greater part of India.

English ▶ Mountain persimmon.

Ayurvedic ▶ Visha-tinduka, Kaaka-tinduka.

Siddha/Tamil ▶ Vakkanai, Vakkanatan.

Folk ▶ Timru.

Action ▶ Various plant parts are used in fever, puerperal fever, neuralgia, pleurisy, pneumonia, menorrhagia, dysurea. Fruits are applied externally to boils.

Bark extract—anti-inflammatory, antipyretic and analgesic. Leaves and seeds—antibacterial.

Diospyrin occurs in the bark and wood. Leaves contain hentriacontane, hentriacontanol, beta-sitosterol, alpha-and beta-amyrin, lupeol, taraxerol and ursolic acid.

Alcoholic extract of the plant showed CNS depressant and spasmolytic activity and also produced bradycardia and hypertension.

Diospyros tomentosa Roxb.

Synonym ▶ *D. exsculpta* Buch.-Ham.

Family ▶ *Ebenaceae.*

Habitat ▶ Sub-Himalayan tract from Ravi to Nepal, also in Rajasthan, Madhya Pradesh, Bihar and Orrisa.

English ▶ Nepal Ebony Persimmon.

Ayurvedic ▶ Viralaa, Tinduka (var.).

Siddha/Tamil ▶ Tumbi.

Folk ▶ Ebony.

Action ▶ Astringent, anti-inflammatory, styptic. Various plant parts are used for dry cough, bronchitis, pleurisy, pneumonia, dysuria, fistula, tumours, bleeding gums, haemorrhagic conditions.

The leaves and stems gave beta-sitosterol, lupeol, betulin, betulinic and oleanolic acids.

Unsaponifiable matter of seeds showed CNS depressant activity.

Dipterocarpus alatus Roxb.

Synonym ▶ *D. incanus* Roxb.

Family ▶ *Dipterocarpaceae.*

Habitat ▶ The Andamans.

English ▶ Gurjun.

Ayurvedic ▶ Ashwakarna, Garjan, Shveta-Garjan, Jarandruma.

Action ▶ Decoction of the bark is prescribed in rheumatism. Oil—applied to ulcerated wounds. Balsam—applied externally in gonorrhoea.

Dipterocarpus resin gave sesquiterpenoids. The essential oil contains 2 sesquiterpenoids of eudesmane series.

Dipterocarpus turbinatus Gaertn. f.

Synonym ▶ *D. indicus* Bedd.

Family ▶ *Dipterocarpaceae.*

Habitat ▶ The Andamans and Assam.

English ▶ Common Gurjun tree, Wood Oil tree.

Ayurvedic ▶ Ajakarna, Chhaagakarna, Ashwakarna.

Siddha/Tamil ▶ Enney, Saara.

Folk ▶ Gurjan.

Action ▶ Oleo-resin (known as Gurjan Oil or Gurjan Balsam)—stimulant to genitourinary system, diuretic, spasmolytic; used externally on ulcers, ringworm and other cutaneous affections. Bark—a decoction is prescribed rheumatism.

Essential oil from oleo-resin contained humulene, beta-caryophyllene, a bicyclic sesquiterpene hydrocarbon and a sesquiterpene alcohol.

The twig bark contains 9% tannin and 7.3% soluble non-tans.

Dosage ▶ Oil—3–5 ml. (*CCRAS.*)

Dodonaea viscosa Linn. Jacq.

Family ▶ *Sapindaceae.*

Habitat ▶ North-western Himalaya up to 1,350 m, in Punjab, South India, ascending to 2,400 m on Nilgiris. Also planted as a hedge plant in Northern India.

English ▶ Jamacia Switch Sorrel.

Ayurvedic ▶ Raasnaa (substitute, used in Andhra Pradesh). (Raasnaa is equated with *Pluchea lanceolata* C. B. Clarke.)

Siddha/Tamil ▶ Virali, Velari.

Action ▶ Leaves—anti-inflammatory and antibacterial (used in the treatment of swellings, burns, wounds), febrifuge, embrocation of leaves is applied to sprains. Bark—astringent and anti-inflammatory. Aerial parts—hypoglycaemic.

The plant contains bioflavonoids (vitamin P) which are biologically active in improving blood circulation and strengthening capillaries. Aqueous and alcoholic extracts of the plant exhibited cardioinhibitory and coronory constricting, also spasmolytic, sedative and hypotensive activity.

The leaves and pods gave iso-rhamnetin-3-O-rutinoside, quercetin-3-O-galactoside and quercetin-3-O-rutinoside. Resin gave a diterpene carboxylic acid (hautriwaic acid). Flowers gave kaempferol.

Dolichandrone falcate Seem.

Family ▶ *Bignoniaceae.*

Habitat ▶ Moist forests of central and southern India.

Ayurvedic ▶ Mesha-shringi (also equated with *Gymnena sylvestre* R. Br.), Vishaanikaa.

Siddha/Tamil ▶ Kattu Varsana, Kaddalatti, Kaliyacca.

Action ▶ Fruits—bitter, carminative, used in diabetes, urinary disorders, bronchitis and skin diseases. Leaves—applied externally to swollen glands. Abortifacient.

The leaves yield luteolin, chrysin and its 7-rutinoside and glucoside.

Fruits are also known as Rshabhaka in the South.

D

Dolichos biflorus Linn.

Synonym ► *Vigna unquiculata* (L.) Walp.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► A pulse crop, particularly in Madras, Mysore, Mumbai and Hyderabad.

English ► Horsegram.

Ayurvedic ► Kulattha, Kulittha, Khalva, Vardhipatraka.

Unani ► Kulthi.

Siddha/Tamil ► Kollu, Kaanam.

Action ► Plant—used in measles, smallpox, adenitis, burns, sores. Seeds—astringent, antipyretic, diuretic. Decoction or soup is used in affections of the liver and spleen, intestinal colic, in leucorrhoea and menstrual dissorders, urinary discharges. A valuable protein supplement.

The Ayurvedic Pharmacopoeia of India recommends the decoction of dry seeds in calculus and amenorrhoea.

The seeds contain crude protein 20.8, pentosan 10.8 and water-soluble gum 2.8%. The presence of antinutritional components such as haemagglutinin and a protease inhibitor has been reported. The inhibitor activity decreased during germination.

The mean protein value of the seeds is 25.47% which is more or less equivalent to soybean, winged bean and gram. Nutritionally, the horsegram seeds are richer in lysine content when compared to *Cajanus cajan* (Arhar) pulse and gram pulse.

Presence of vitamin A in the green pods makes them a valuable diet for children; green leaves may be used in vitamin C deficiency syndrome, due to the presence of ascorbic acid and calcium. The seeds contain several common phytosterols.

Strepogenin—several times higher than in casein.

A decoction of seeds (soaked or boiled in water) is prescribed as diuretic and antilithiatic and has been clinically established.

Diuretic activity of a dipeptide (pyroglutamylglutamine) has been found to be 2–3 times that of acetazolamide in albino rats.

Globulin fraction of the seeds showed hypolipidaemic effects in rats.

A lectin-like glycoprotein from stems and leaves possesses carbohydrate- binding activity.

Dosage ► Seed—6 g powder; decoction 50–100 ml. (*CCRAS.*)

Dolichos falcatus Seem Klein.

Family ► *Papilionaceae.*

Habitat ► The Himalayas from Kumaon to Khasi Hills and in Western Peninsula.

Ayurvedic ► Kulatthikaa.

Action ► Root—prescribed for constipation and skin diseases. A decoction of seeds is used for rheumatism.

Dolichos lablab Linn. var. **typicus** Prain.

Synonym ► *Lablab purpureus* Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Cultivated throughout India.

English ► Indian Butter Bean, Lablab Bean, Horsebean.

Ayurvedic ► Nishpaav, Sem.

Unani ► Lab Laab, Semphali.

Siddha/Tamil ► Avarin.

Action ► Seeds—febrifuge, stomachic, antispasmodic, antifungal.

Key application ► As expectorant. (*The British Herbal Pharmacopoeia.*)

Lablab pods contain protein 4.5, carbohydrates 10.0, calcium 0.05%; vitamin C (7.33 to 10.26 mg/100g in cooked samples; 0.77–1.12 mg/100 g in uncooked samples) increases on cooking. Enzyme liberation of essential amino acids from protein is slower than from casein and wheat.

Callus tissue of *Dolichos lablab* Linn. (Horsebean) showed presence of beta-sitosterol, stigmasterol, lanosterol and cholesterol. The isolated flavonoids show antifungal activity (the maximum amount of flavonoids was found in the flowers). The plant contains the alkaloid, trigonelline, which exhibits hypoglycaemic activity. The maximum alkaloid was found in the seeds (0.14 mg/g dry weight). In tissue cultures raised from seedlings, the maximum amount was present in the tissue at the age of 6 weeks (0.068 mg/g dry weight).

Dorema ammoniacum D. Don.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Persia, South-West Asia, Southern Siberia.

English ► Ammoniacum, Gum ammoniac.

Ayurvedic ► Uushaka, Ushaka.

Unani ► Ushaq, Ushah, Kandal.

Action ► Gum-resin—antispasmodic, expectorant, diaphoretic, emmenagogue, used in cough, asthma, bronchitis and catarrh, especially when the secretion is tough and viscid. Also used in enlargement of liver and spleen.

Gum-resin from the flowering and fruiting stems contain resin (60–70%), consisting mainly of amino-resinol; gum; volatile oil, about 0.5%, containing ferulene as major component; free salicylic acid; coumarins (umbelliferone is absent).

Ammoniacum is similar to asafoetida in medicinal properties.

Doronicum hookeri Hook. f.

Family ► *Compositae; Asteraceae.*

Habitat ► The Himalayas at Lachen and Tungu, and Sikkim.

English ► Leopard's Bane. (*Arnica montana* Linn. is also known as Leopard's Bane.)

Unani ► Daarunaj Aqrabi.

Action ► Root—used as a constituent of cardiac and nervine tonics. Used as exhilarant. Acts as a stomachic and dissolves trapped gases.

D

Doronicum pardalianches Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Europe.

Unani ► Daarunaj Aqrabi.

Action ► Used in nervous depression, melancholia and as a constituent of cardiac tonic preparations.

The plant contains photoactive thiophenes, in amounts reported to be toxic. Roots and aerial parts yield sesquiterpene alcohol, paralianchol and its aetophenone derivatives.

Doronicum roylei DC.

Family ► *Compositae; Asteraceae.*

Habitat ► The Western Himalayas from Kashmir to Garhwal.

Unani ► Daarunaj Aqrabi Hindi.

Action ► The root is reported to prevent giddiness caused during high attitude ascents.

Dracaena cinnabari Balf. f.

Family ► *Liliaceae.*

Habitat ► Native to East Africa and Saudi Arabia.

English ► Dragon's Blood.

Ayurvedic ► Khoonkharaabaa, Heeraadokhi.

Unani ► Dammul-Akhwain.

Action ► See *Daemonorops draco.*

The root yields a gum-resin, used in gargle water as stimulant, astringent and in toothpaste. Root—used in rheumatism. Leaves—carminative.

Dracocephalum moldavica Linn.

Family ► *Lamiaceae.*

Habitat ► The temperate Western Himalaya in Kashmir from 2,100–2,400 m.

Ayurvedic ► Raam Tulasi.

Unani ► Feranjmushk.

Action ► Seeds—Febrifuge, carminative, astringent, demulcent, vulnerary. Used is cephalalgia, neurological disorders, as a cardiac tonic, brain tonic and deobstruent in Unani medicine.

Citral and geranyl acetate are major constituents of the essential oil. Others include alpha-pinene, nerol, citronellol, linalool, geraniol, limonene and caproic acid. Flavonoids, including moldavoside, have been isolated from the plant.

Dracontium polyphyllum Linn.

Family ► *Araceae.*

Habitat ► Maharashtra and Karnataka; cultivated in the South.

Siddha/Tamil ► Kattu Karunayikkilangu.

Folk ► Jangali Suuran.

Action ► Root—antidiarrhoeal, anti-inflammatory (prescribed for haemorrhoids), antispasmodic

(used in asthma), emmenagogue, abortifacient.

Dregea volubilis (Linn. f.) Benth. ex Hook. f.

Synonym ► *Wattakaka volubilis* (Linn. f.) Stapf.

Family ► *Asclepiadaceae.*

Habitat ► Konkan and Maharashtra, also in Bengal and Assam.

Ayurvedic ► Suparnikaa, Madhumaalati. Muurvaa (substitute). Nak-chhikkini.

Siddha/Tamil ► Kodippalai.

Action ► Root and tender stalks—emetic and expectorant, cause sneezing, used in colds, sinusitis, and biliousness. Leaves—used as an application to boils and abscesses.

The stems and leaves contain a pigment taraxerol, a triterpenoid, kaempferol, a glucoside of kaempferol and saponins. Seeds contain a number of pregnane glycosides which do not exhibit digitalis-like action. Root contains a glucoside which lowered carotid blood pressure in mice and dogs when administered intravenously.

Drosera peltata Sm.

Synonym ► *D. lunata* Buch.-Ham.

Family ► *Droseraceae.*

Habitat ► Throughout India, up to 2,438 m.

English ► Sundew.

Ayurvedic ► Brahma-suvarchalaa (doubtful synonym).

Folk ► Mukhjali. (*Drosera burmannii* Vahl is also known as Mukhjali.)

Action ► Resin from plant—used in bronchitis and whooping cough. Plant—antisyphiylitic. Bruised leaves, mixed with salt are applied for treating blisters.

Key application ► Drosera rotundifolia—in dry cough and coughing fits, as bronchoantispasmodic. (*German Commission E.*).

The leaves contain napthaquinones, plumbagin (0.5%), droserone (3-hydroxyplumbagin) and hydroxydroserone (0.01%), and the flavonoids, quercetin, gossypetin, gossypin and isogossypitrin. The antispasmodic action of the herb has been attributed to naphthoquinones. Plumbagin is antimicrobial *in vitro* against some Gram-positive and Gram-negative bacteria, influenza virus, pathogenic fungi and parasitic protozoa, and is active against some species of *Leishmania.* In large doses plumbagin is cytotoxic, but in small doses exhibits immunostimulating activity *in vitro*.

A related species, *Drosera indica* Linn., is found in Deccan peninsula, particularly in the West coast. Plumbagone, isolated from the plant, depresses the isolated intestine of the guinea-pig and suppresses the effect of acetylcholine. In Indo-China, a maceration of the plant is applied topically to corns.

In Western herbal, Sundew is obtained from the aerial parts of *Drosera*

rotundifolia which grows throughout Europe.

D

Drynaria quercifolia (Linn.) J. Smith.

Synonym ► *Polypodium quercifolium* Linn.

Family ► *Polypodiaceae.*

Habitat ► Throughout India, in plains and low mountains.

Ayurvedic ► Ashvakatri (non-classical).

Folk ► Baandar-Baashing (Maharashtra).

Action ► Pectoral, expectorant. anthelmintic. Used in the treatment of chest diseases, cough, hectic fever, dyspepsia, loss of appetite, chronic jaundice and cutaneous affections. Pounded fonds are used as poultice for swellings. Peeled rhizome with sugar is prescribed for urinary disorders and in spermatorrhoea.

Aqueous extracts possess antibacterial properties.

Dryobalanops camphora Colebr.

Synonym ► *D. aromatica* Gaertn. f.

Family ► *Dipterocarpaceae.*

Habitat ► From Borneo to Sumatra islands.

English ► Borneo or Barus Camphor.

Ayurvedic ► Bhimseni Kapoor.

Folk ► Baraas Kapoor.

Action ► See *Cinnamomum camphora.*

Dryopteris dentata (Forsk.) C. Chr.

Synonym ► *Cyclosorus dentatus.*

Family ► *Polypodiaceae.*

Habitat ► Throughout India in the plains, also on the hills.

Action ► Aqueous extracts—antibacterial against *Staphylococcus aureus.*

Dryopteris filix-mas(Linn.) Schoutt

Synonym ► *Aspidium filix-mas* Linn.

Family ► *Polypodiaceae.*

Habitat ► Temperate regions of America, Europe, Asia, near damp and shady terrains.

English ► Male Fern, Aspidium.

Unani ► Sarakhs, Sarakhs Muzakkar.

Siddha/Tamil ► Iruvi.

Action ► Taenifuge, vermifuge (normally used in conjunction with a saline purgative, not used with castor oil.) Also, deobstruent, abortifacient.Externally for rheumatism, sciatica and neuralgia. No more in use as an anthelmintic as better alternatives are available.

Rhizomes and fonds contain filicin (2%), a mixture of dimeric, trimeric and tetrameric butanone chloroglucosides, that kills tapeworms. Excessive dose of filicin may cause intestinal

cramps and blindness, also liver damage.

Related Himalayan species include: *D. odontoloma* (Kashmir valley), *D. marginata, D. barbigera* (Kashmir to Sikkim), *D. schimperiana* (Mussoorie) and D. blanfordii (Chattri, Chamba).The ferns gave filicin 2.3, 2.1, 2.1, 4.4 and 3.5%, respectively.

Drypetes roxburghii (Wall.) Hurusawa.

Synonym ► *Putranjiva roxburghii* Wall.

Family ► *Euphorbiaceae.*

Habitat ► Wild and cultivated throughout tropical India.

Ayurvedic ► Putrajivaka, Sutajva, Putrakamanjari.

Siddha/Tamil ► Karupali, Irukolli.

Action ► Leaves, fruits and stones of fruits are given in colds and fevers, also in rheumatic affections. Rosaries, made of hard stones of the fruit, are placed around the necks of children to protect them from diseases.

The seed kernel yield 0.5% of a sharp-smelling essential oil of the mustard oil type. The oil contains isopropyl and 2-butyl isothiocyanates as the main constituents and 2-methyl-butyl isothiocyanate as minor component. An additional glucoside, glucocleomin, has been found in the seed kernels. A glucosidic pattern similar to that in the seeds is reported in the shoots and roots.

The fruit pulp contains a large proportion of mannitol and small quantities of a saponin glucoside and alkaloid. The alkaloid is also present in a small quantity in the stones of the fruit.

Dosage ► Seed, leaf, bark—3–6 g powder. (*CCRAS.*)

Duranta plumieri Jacq.

Synonym ► *Duranta repens* Linn.

Family ► *Verbenaceae.*

Habitat ► Cultivated as a hedge plant.

Folk ► Durantaa.

Action ► Antifungal (topically).

The leaves contain a saponin and fruits an alkaloid analogous to narcotine. Macerated fruits, which even in dilutions of 1 : 100 parts of water, is lethal to mosquito larvae (the action is less marked on *Culicine* larvae.

Durio zibethinus Linn.

Family ► *Bombacaceae.*

Habitat ► Native to Malaysia; cultivated in South India for its edible fruit, in lower elevations of the Nilgiris and some parts of the West Coast.

English ► Durian, Civet Fruit.

Folk ► Durio

Action ► Fruit—reduces lethality of alcohol. Leaves and roots—used in a prescriptions for fever. Leaves—used in medicinal bath during fever. Fruit-walls—used externally for

skin diseases. Ashes of the skin—given after childbirth.

The edible pulp of the fruit contains about 12% total sugars and an equal amount of starch; crude protein 2.8, fat 3.9, total carbohydrates 34.1, mineral matter 1.2%; carotene 20, vitamin C 25 mg/100 g.

The seeds are edible like chestnuts after roasting.

Dysoxylum binectariferum Hook. f.

Family ► *Meliaceae.*

Habitat ► Assam, Sikkim, Bengal and the Western Ghats.

Siddha/Tamil ► Agunivagil, Cembil.

Folk ► Lassuni (West Bengal).

Action ► Fruit—anti-inflammatory, diuretic, CNS depressant.

The bark from mature trees contain 15% tannin and that from young trees 10%.

EtOH (50%) extract of fruit—anti-inflammatory, diuretic and CNS depressant.

The fruit contains a tetranortriterpenoid, dysobinin, a potential CNS depressant and inflammation inhibitor.

The stem bark contains an alkaloid, rohitukine, which exhibited anti-inflammatory and immunomodulatory property.

E

Ecballium elaterium A. Rich.

Family ► *Cucurbitaceae.*

Habitat ► Mediterranean region and Western Asia.

English ► Squirting Cucumber.

Ayurvedic ► Kantaki Indravaaruni (non-classical).

Folk ► Kateri Indryaayana, Kitran.

Action ► Hydragogue; employed for the evacuation of dropsy, especially in nephritic patients. Root—used to treat skin diseases and parasitic scalp diseases; also for scirrhous eruptions.

Roots, leaves and fruits yield cucurbitacins C, D, E, G, H and I. Fruit juice gave cucurbitacins B, L and R and their derivatives. Cucurbitacins (tetracyclic triterpene glycosides) are toxic constituents of the fruit.

Ecbolium linneanum Kurz.

Synonym ► *E. viride* (Forsk.) Alston. *Justica ecbolium* Linn.

Family ► *Acanthaceae.*

Habitat ► Northeastern Peninsular India.

English ► Blue Fox Tail Nail Dye.

Siddha/Tamil ► Nilambari.

Action ► Plant—used in gout and dysuria; decoction of leaves for stricture. Roots—given in jaundice, menorrhagia and rheumatism.

The leaves, flowers and roots yield orientin, vitexin and their isoflavones.

Echinochloa colonum (Linn.) Link.

Synonym ► *Panicum colonum* Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated in Maharashtra, Madhya Pradesh, Uttar Pradesh, Karnataka, Tamil Nadu, Bihar and Andhra Pradesh.

English ► Shama millet.

Ayurvedic ► Varaka.

Siddha/Tamil ► Karumpul, Varsanampillu.

Folk ► Jangali sawuk, Shamaa, Saanvaa.

Action ► Diuretic.

The protein content of the dehusked millet is higher when compared to rice. Except for lysine all other essential amino acids are present in fair quantity. The grains are a rich source of zinc and iron.

Echinochloa crus-galli (Linn.) Beauv.

Synonym ► *Panicum crus-galli* Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated mainly in Maharashtra, Madhya Pradesh,

Karnataka, Tamil Nadu and Andhra Pradesh.

English ► Barnyard Millet.

Ayurvedic ► Ambah Shyaamaaka.

Siddha/Tamil ► Oathupul.

Folk ► Samak.

Action ► Whole plant—used for diseases of the spleen and for checking haemorrhage.

The grains are rich in carbohydrates (3.474 wt %) and trace elements (Cu, Cd, Cr, Ni, Fe, Mn, Sn). The total protein content is 4.2 wt% and the total lipids 4.46%. A hormone, oestrogen, is reported from the lipid.

A polysaccharide extracted from the endosperm and composed of glucose was identified as a phytoglycogen.

Echinochloa frumentacea Link.

Synonym ► *Panicum frumentaceum* Roxb.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated mainly in Karnataka, Tamil Nadu, Uttar Pradesh and Madhya Pradesh.

English ► Japanese Barnyard Millet.

Ayurvedic ► Shyaamaaka.

Siddha ► Kudrraivali pillu (Tamil).

Folk ► Shamaa, Saanvaa.

Action ► Plant—cooling and digestible, considered useful in biliousness and constipation.

The millet has a well balanced amino acid composition, but is deficient in lysine. Glutelin is the major constituent of protein.

Echinops echinatus Roxb.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout India.

English ► Globe-Thistle, Camel's Thistle.

Ayurvedic ► Utkantaka, Uttundaka, Brahmadandi.

Folk ► Uunta-Kateraa.

Action ► Alterative, diuretic, nerve tonic (used in hoarse cough, dyspepsia, scrofula, hysteria.)

Aerial parts of the plant contain alkaloids, echinopsine, echinopsidine and echinozolinone. Taraxasterol acetate, isolated from the plant, is a potent anti-inflammatory constituent; the ethanolic extract of the whole plant is more effective when administered parenterally than orally. Apigenin and its derivatives, echinacin and echinaticin show antifungal activity.

Eclipta alba (Linn.) Hassk.

Synonym ► *E. prostrata* Roxb.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout India, up to 2,000 m on the hills.

English ► Trailing Eclipta Plant.

Ayurvedic ► Bhringaraaja, Bhringa, Bhringaja, Bhrngaaraka, Bhrngaara, Maarkava, Kesharaaja, Keshranjana.

Unani ► Bhangraa.

Siddha/Tamil ► Karisalaankanni.

Folk ► Bhangaraa.

Action ► Deobstruent, antihepatotoxic, anticatarrhal, febrifuge. Used in hepatitis, spleen enlargements, chronic skin diseases. Leaf—promotes hair growth. Its extract in oil is applied to scalp before bed time in insomnia. The herb is also used as an ingredient in shampoos.

Key application ► As hepatoprotective. (*Indian Herbal Pharmacopoeia; The Ayurvedic Pharmacopoeia of India.*)

The herb should be dried at room temperature under shade. Its active principles are lost due to aerial oxidation during sun drying or drying under reduced pressure below 40°C. The herb contains wedelolactone and demethylwedelolactone, which showed a dose-dependent effect against CCl4, *d*-galactosamine- or phalloidin-induced cytotoxicity in primary cultured rat hepatocytes, and exhibited potent antihepatotoxic property. The whole plant shows effect on liver cell regeneration. Immunoactive property has been observed against surface antigen of hepatitis B-virus. The plant is also reported to be effective in the treatment of peptic ulcer, inflammatory diseases, including rheumatoid arthritis, diseases of the gallbladder and skin infections.

Aqueous extract of leaves exhibits myocardial depressant and hypotensive activity (unrelated to cholinergic and histaminergic effects).

The roots are very rich in thiophene acetylenes. Thiophene derivatives show activity against nematodes.

Dosage ► Whole plant—3–6 ml fresh juice; 13–36 g for decoction. (*API* Vol. II.)

Ehretia buxifolia Roxb.

Synonym ► *Carmona microphylla* (Lam.) G. Don.

Family ► *Ehrethiaceae.*

Habitat ► Common in dry scrub forests of the Deccan Peninsula.

Siddha/Tamil ► Kuruvingi, Kattuvettilai.

Folk ► Pala.

Action ► Root—alterative in cachexia and syphilis; an antidote to vegetable poisoning. Dried leaves—pectic and stomachic.

The plant contains microphyllone. EtOH (50%) extract of aerial parts showed low anti-inflammatory and cardiovascular activities.

Ehretia laevis Roxb. var. aspera (Willd.) C.B. Clarke.

Synonym ► *E. aspera* Willd.
E. obtusifolia Hochst. ex DC.

Family ► *Ehretiaceae.*

Habitat ► Throughout India, also grown along roadsides.

Ayurvedic ► Charmi-vrksha.

Siddha/Tamil ► Addula.

Folk ► Chamror (Punjab). Kuptaa, Datarangi (Maharashtra.)

Action ► Root—used in venereal diseases. A decoction of bark is used internally and as gargle in throat infections.

The plant contains tannins, saponins and allantoin, and monomethyl ethers of cyclitols. Leaves yielded a pyrrolizidine alkaloid, creatinine.

E

Eichhornia crassipes Solms Laub.

Synonym ► *E. speciosa* Kunth.

Family ► *Pontederiaceae.*

Habitat ► Native to tropical South America; naturalized all over India.

English ► Water-Hyacinth, Bengal Terror, Blue Devil, The Million Dollar Weed.

Ayurvedic ► Wrongly equated with Jalakumbhi (*Pistia stratiotes* Linn., Tropical Duckweed.)

Siddha/Tamil ► Akasa thammarai.

Action ► Flower—antifungal. Used in skin diseases.

The plant gave stigmasterol, roots gibberellins, flowers delphinidin glucoside.

The leaves contain a good amount of protein (18% on dry wt basis). The content of water soluble pectins in leaf, petiole and root is: 1.3–5.8, 1.5–7.2 and 1.0–2.5% respectively.

Research shows that Water-Hyacinth can be used as a source to remove minerals, organic substances and even heavy metals like Cd, Cr, Cu, Zn and Ni present as pollutants from domestic or industrial effluents. It can also remove arsenic effectively. It can be used in purification of silver-containing waste water, also for the treatment of low-level liquid radioactive wastes and mercurial waste water. The plant has a strong capacity for removing phenol. Biomass of non-living dried water Hyacinth roots showed high absorption of copper from aqueous solutions.

The plant exhibits antifungal activity against *Candida albicans*.

Elaeocarpus ganitrus Roxb. ex G. Don.

Synonym ► *E. sphaericus* K. Schum. *Ganitrus sphaericus* Gaertn.

Family ► *Elaeocarpaceae.*

Habitat ► West Bengal, Madhya Pradesh, Maharashtra, Orissa, Andhra Pradesh, Western Ghats.

English ► Utrasum Bead tree.

Ayurvedic ► Rudraaksha, Panchmukhi.

Siddha/Tamil ► Rudraaksham.

Action ► Fruit—used for epileptic fits and headache. Powdered fruits (0.5 g) mixed with warm water are given two/three times daily in asthma. Stem bark—hypoglycaemic.

The Ayurvedic Pharmacopoeia of India indicated the use of the seed in hypertension, insomnia, psychoneurosis and mental diseases.

The fruits contain palmitic, isopalmitic, linoleic and myristic acids. Leaves gave alkaloids—rudrakine, (+)-elacocarpine and (+)-*iso*-elacocarpine;

phenolics—quercetin, gallic acid and ellagic acid. EtOH (50%) extract of stem bark—hypoglycaemic. Aqueous extract of fruits—sedative, hypotensive, spasmolytic, anticonvulsant, choleretic, bronchodilatory and cardiostimulant.

The fruit of *E. oblongus* Mast. non-Gaertn., synonym *E. glandulosus* Wall. ex Merrill (Western Ghats) is used in mental disorders and tetanus.

Dosage ► Seed—1–2 g. (*API* Vol. IV.)

Elaeocarpus serratus Linn.

Synonym ► *E. cuneatus* Wt.

Family ► *Elaeocarpaceae.*

Habitat ► Eastern Himalayas and Western Ghats up to 1,000 m.

English ► Wild Olive tree, Ceylon Olive.

Ayurvedic ► Rudraaksha (var.).

Siddha/Tamil ► Uttraccham, Ulankarei.

Action ► Leaf—antirheumatic. Fruit—antidysenteric. Aerial parts—CVS and CNS active.

The leaves gave ellagic acid, myricitrin, myricetin and mearnsetin. Fruit pulp gave citric acid and D-galactose. It contains pectin (2.57% fresh weight basis).

Elaeocarpus tuberculatus Roxb.

Family ► *Elaeocarpaceae.*

Habitat ► Western Ghats from Kanara southwards.

Ayurvedic ► Rudraaksha (var.).

Siddha/Tamil ► Ruthracham, Pagumbar.

Folk ► Rudirak, Bhutali.

Action ► Bark—stomachic, antibilious. Used in haematemesis. Nut—antiepileptic, antirheumatic.

The leaves gave quercetin, kaempferol, gallic acid and ethylgallate.

Elaeodendron glaucum Pers.

Synonym ► *Cassine glauca* (Rottb.) Ktze.

Family ► *Celastraceae.*

Habitat ► Throughout India, also planted as an ornamental.

Ayurvedic ► Krishnamokshaka.

Siddha/Tamil ► Selluppaimaram.

Folk ► Kaalaa-mokhaa, Ratangaruur. Jamrasi (gum).

Action ► Astringent, anti-inflammatory, emetic.

The bark and the leaves contain 8–13.5 and 8–15% tannin respectively.

Powdered leaves have a sternutatory action and are used as snuff to relieve headache and as a fumigatory in hysteria (in folk medicine it is believed that the smoke wards off ghosts.)

Fresh root bark is rubbed into a paste with water and applied to swellings. A cold water extract of the crushed roots is used as an emetic (fatal in overdoses).

Eleocharis dulcis Trin.

Synonym ► *E. plantaginea* R. Br. *E. tuberosa* Schult.

E

Family ► *Cyperaceae.*

Habitat ► Widely cultivated in China. Sold in Kolkata under the name Singapuri Keysur.

English ► Chinese Water Chestnut.

Ayurvedic ► Shringaataka (substitute), Kasheruka (substitute).

Action ► Tuber—antidysenteric, antileucorrhoeic, antibacterial.

The juice expressed from the tuber shows antibiotic activity against *Staphylococcus aureus*, *E. coli* and *Aerobacter aerogenes*. The antibiotic principle has been designated as puchiin.

In ethanolic extract, hexacosanoic acid, 5 alpha-stigmastane-3, 6-dione, betulin and tricin were present. It also contained beta-sitosterol and stigmasterol.

Elephantopus scaber Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout warmer parts of India.

Ayurvedic ► Mayura-shikhaa, Gojihvaa. (*Actinopteris dichotoma* Bedd. and *Celosia cristata* Linn. are also used as Mayura-shikhaa. *Anchusa strigosa* Lebill., and other *Boraginaecae* sp. are used as Gojihvaa.)

Siddha/Tamil ► Yaanaichhuvadi.

Folk ► Mayurjuti, Maaraajuti.

Action ► Plant—astringent, cardiac tonic, diuretic, mucilaginous, emmolient (used in dysuria, diarrhoea, dysentery. Leaves—applied to ulcers and eczema. Roots—given to patients with heart and liver affections; topically in rheumatism. Root and leaf—used in dysuria and other urethral complaints. An infusion of the whole plant is used to stimulate diuresis, reduce fever and to eliminate bladder stones. The decoction is also used in peptic ulcers, swelling or pain in stomach. Plant is also used in piles and scabies.

The plant contains germacranolide dilactones. Hydroxylated germacanolides, molephantin and molephantinin, exhibited cytotoxic and antitumour properties.

The plant also gave epifriedelanol, lupeol, stigmasterol, triacontan-*l*-ol and dotriacontan-*l*-ol.

Elettaria cardamomum Maton.

Family ► *Zingiberaceae.*

Habitat ► Cultivated either as pure plantation crop, or as subsidiary to coffee and arecanut in hilly forests regions of Western Ghats in Karnataka and Kerala, and in parts of Madurai, the Nilgiris and Tirunelveli in Tamil Nadu.

English ► Lesser Cardamom.

Ayurvedic ► Elaa, Sukshmailaa, Kshudrailaa, Bhrngaparnikaa, Tutthaa, Draavidi, Prithvikaa, Triputaa, Truti, Upkunchikaa.

Unani ► Heel Khurd.

Siddha/Tamil ► Yelakkai, Ilam.

Folk ► Ilaayachi.

Action ► Carminative antiemetic, stomachic, orexigenic, anti-gripe, antiasthmatic, bechic, Oil—antispasmodic, antiseptic. Used for flatulence, loss of appetite, colic, bronchitis, asthma. Paste used as balm for headache, husk for rheumatism.

Key application ► In dyspepsia; also as cholagogue. (*German Commission E.*)

The seeds yield an essential oil (6–11% dry basis). The major constituents are, 1,8-cineole and alpha-terpinylacetate, with limonene, alpha-terpineol, sabinene and linalool. The seeds contain palmitic and oleic as dominant fatty acids, besides linoleic and linolenic acids, along with alpha-tocopherol, desmosterol and campesterol.

The extracts of cardamom cause a significant decrease in gastric secretion after 3 h of treatment. The effect of methanol extract is primarily observed as decreased pepsin output.

Terpineol and acetylterpineol, the active principles of cardamom seeds, showed greater penetration enhancing capacities than Azone which was used as a comparative penetration enhancer for the diffusion of Prednisolone through mouse skin *in vitro*.

Volatile components exhibit antimicrobial activity. The oil inhibits aflatoxin synthesis.

The cardamom seed can trigger gallstone colic (spasmodic pain) and is not recommended for self-medication in patients with gallstone. (*German Commission E, PDR, Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Seed of dried fruit—1–2 g powder. (*API* Vol I.)

Eleusine coracana Gaertn.

Family ► *Gramineae; Poaceae.*

Habitat ► A grain crop of Karnataka; also grown on large scale in Tamil Nadu, Andhra Pradesh and Maharashtra.

English ► Finger Millet, African millet, Ragi.

Ayurvedic ► Madhuuli, Markata-hasta-trna.

Siddha/Tamil ► Ragi, Kezhvaregu.

Action ► Seeds—cooling, astringent. Nutritive value of ragi is higher than that of rice and equal to that of wheat. White ragi is superior to the pigmented type. A nourishing food for infants, growing children, expectant mothers and aged people. Ragi is considered an ideal food for diabetics because of slow release of sugars to the body. A decoction of leaves and stems is drunk to ease vaginal bleeding.

The protein content of ragi is 8–13%, with P 250, Fe 7.6, thiamine 0.18—and riboflavin 0.1 mg/100 g. Ragi has high glycemic index value. It reduced plasma cholesterol, total serum cholesterol and LDL cholesterol by 9% each, and triglycerides by 15%, and increased HDL cholesterol, thus exhibited a significant beneficial effect on plasma profile. The lipemic index for ragi is 55, taking isocaloric wheat-supplemented background diet (control) at 100.

E

Eleusine indica Gaertin.

Family ▶ *Gramineae, Poaceae.*

Habitat ▶ Australia, North America; throughout the warmer parts of the world. In India, in wet plains and low hills and pasture grounds.

English ▶ Crowfoot Grass, Crab Grass.

Ayurvedic ▶ Nandimukha (var.).

Folk ▶ Nandiaa (Orissa), Mahaar Naachni (Maharashtra), Thippa Ragi (Tamil Nadu).

Action ▶ Used for biliary disorders. In Vietnamese traditional medicine, a decoction of the whole plant is used as stomachic, diuretic, febrifuge, and in sprains.

Aerial parts contain vitexin, 3-O-beta-D-glucopyranosyl-beta-sitosterol and its 6′-O-palmitoyl derivatives.

Elsholtzia cristata Willd.

Synonym ▶ *E. ciliata* (Thunb.) Hyland.
Perilla polystachya D. Don.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ The Himalayas and Assam up to 3,000 m, introduced into the Nilgiris (Tamil Nadu).

Ayurvedic ▶ Ajagandhaa (controversial synonym).

Folk ▶ Ban-Tulasi, Bovai, Phoot-Kanda.

Action ▶ Carminative, stomachic, astringent. Leaf—diuretic, antipyretic. Neutralizes after effects of intoxication. Used for abdominal pains, nausea, bleeding nose. Fresh plants from Uttaranchal gave 0.4% essential oil having dehydroelsholtzia ketone 88.7% as the main constituent, followed by humulene 2.4% and caryophyllene 0.9% (the oil composition of the species which grow in Japan and Kashmir is different.)

Plant contains linarin, apigenin and 7-O-glucosides of apigenin and luteolin.

The Japanese species, used for hangovers, gave compounds including triterpenoids, steroids and flavonoids.

Elsholtzia blenda Benth., synonym *Perilla elata* D. Don, is also equated with Ban-Tulasi. Major constituent of the essential oil is geranyl acetate. Other constituents are *p*-cymene, sabinene, borneol, geraniol, linalyl acetate, fernesol, limonene, linalool, citronellol, thymol and nerolidol.

Elytraria crenata Vahl.

Synonym ▶ *E. acaulis* Lindau.
Tubiflora acaulis Kuntze.

Family ▶ *Acanthaceae.*

Habitat ▶ The Deccan Peninsula, extending northwards to eastern Himalayas.

Folk ▶ Patharchattaa, Dasmori. (Also known as Shat-muuli.)

Action ▶ Leaves—decoction prescribed in fever, also in venereal diseases. Root—used in mammary tumours and abscesseses, pneumonia and infantile diarrhoea. Plant

infusion is used as a cough remedy for infants.

Embelia ribes Burm. f.

Family ► *Myrsinaceae.*

Habitat ► Throughout India.

English ► Embelia.

Ayurvedic ► Vidanga, Krmighna, Krmihara, Krmiripu, Chitratandula, Jantughna, Jantunaashana, Vella, Amogha.

Unani ► Baobarang, Barang Kaabuli.

Siddha/Tamil ► Vaayuvidangam.

Action ► Ascaricidal, anthelmintic, carminative, diuretic, astringent, anti-inflammatory, antibacterial, febrifuge. Used in diseases of chest and skin. Active principles are found to be oestrogenic and weakly progestogenic. Root—bechic, antidiarrhoeal. Seed—spermicidal, oxytocic, diuretic. The plant is also used for its blood purifying properties. It is an ingredient in cough syrups, preparations for anaemia, genitourinary tract infections, diarrhoea and diseases of the liver.

Embelin, isolated from the berries, shows significant anti-implantation and post-coital antifertility activity. (Successful trials have been carried out at the National Institute of Immunology, New Delhi on human beings.) It is found to be a potential male antifertility agent. Spermatogenesis has been impaired and sperm count reduced to the level of infertility. The antispermatogenic changes are found to be reversible without any toxic effects.

Aqueous and EtOH extract of the fruit—anthelmintic against earthworms. Fruit powder (200 mg/kg), taken with curd on empty stomach, expelled tapeworm within 6–24 h. The treatment was also found effective in giardiasis. EtOH (50%) of the plant was found slightly active against *E.coli*. *Di*-salts of embelin—anthelmintic. Amino salts exhibited less side effects than embelin. The effect of di-isobutyl amino derivatives lasted up to 10 h, also showed anti-inflammatory, hypotensive and antipyretic activities.

Berries gave quinones—embelin, rapanone, homoembelin, homorapnone and vilangin.

Dosage ► Fruit—5–10 g powder. (*API* Vol. I.)

Embelia robusta C. B. Clarke, non-Roxb.

Synonym ► *E. tsjeriam-cottam* A. DC.

Family ► *Myrsinaceae.*

Habitat ► Throughout greater part of India.

Ayurvedic ► Vidanga (allied species) Substitute for *Embelia ribes.*

Folk ► Baayabirang.

Action ► Fruit—antispasmodic, carminative, anthelmintic, antibacterial. Powdered fruit—used in dysentery. Plant—used in weak pulse rate.

EtOH (50%) extract of aerial parts exhibit slightly hypotensive activity. Stem contains embelin. See *Embelia ribes*.

E

Emblica officinalis Gaertn.

Synonym ► *Phyllanthus emblica* Linn.

Family ► *Euphorbiaceae*.

Habitat ► Native to tropical Southeast Asia; distributed throughout India; also planted in public parks.

English ► Emblic, Indian gooseberry.

Ayurvedic ► Aaamalaki, Aaamalaka, Dhaatri, Kaayasthaa, Amoghaa, Amritaphala, Amla, Aaamalaa, Dhaatriphala, Vayasyaa, Vrshya, Shiva, Hattha.

Unani ► Aamalaa, Amlaj.

Siddha/Tamil ► Nellikkaai, Nelli.

Action ► Fruit—antianaemic, anabolic, antiemetic, bechic, astringent, antihaemorrhagic, antidiarrhoeal, diuretic, antidiabetic, carminative, antioxidant. Used in jaundice, dyspepsia, bacillary dysentery, eye trouble and as a gastrointestinal tonic. Juice with turmeric powder and honey is prescribed in diabetes insipidus. Seed—antibilious, antiasthmatic. Used in bronchitis. Bark—astringent. Leaf—juice is given in vomiting.

A decoction of powdered pericarp is prescribed for paptic ulcer.

Key application ► As an antacid. (*Indian Herbal Pharmacopoeia*.).

The fruit is an important source of vitamin C, minerals and amino acids. The edible fruit tissue contains protein concentration threefold and vitamin C (ascorbic acid) concentration 160-fold than those of apple. The fruit also contains considerably higher concentration of most minerals and amino acids than apple.

The fruit gave cytokinine-like substances identified as zeatin, zeatin riboside and zeatin nucleotide; suspension culture gave phyllembin. Phyllembin exhibits CNS depressant and spasmolytic activity, potentiates action of adrenaline and hypnotic action of Nembutal.

The leaves contain gallic acid (10.8 mg/g dry basis), besides ascorbic and music acid. The methanol extract of the leaves is found to be effective in rat paw inflammation.

The bark contains tannin identified as mixed type of proanthocyanidin.

The fruit contains superoxide dismutase 482.14 units/g fresh weight and exhibits antisenescent (anti-aging) activity. Fruit, juice, its sediment and residue are antioxidant due to gallic acid. EtOH (50%) extract—antiviral.

Aqueous extract of the fruit increases cardiac glycogen level and decreases serum GOT, GPT and LDH in rats having induced myocardial necrosis.

Preliminary evidence suggests that the fruit and its juice may lower serum cholesterol, LDL, triglycerides and phospholipids without affecting HDL levels and may have positive effect on atherosclerosis. (*Eur J clin Nutr*, 42, 1988, 939–944; *Phytother Res*, 14, 2000, 592–595.)

An aqueous extract of the fruit has been reported to provide protection against radiation-induced chromosomal damage in both pre-and post-irradiation treatment. The fruit is reported to enhance natural killer cell activity and antibody dependent cellular cytotoxicity in mice bearing Dalton's lymphoma ascites tumour. The extract of the fruit and ascorbic acid prevented hepatotoxic and nephrotoxic effects induced by lead and aluminium. The toxicity could be counteracted to a great extent by the fruit extract than by an amount of ascorbic acid alone equivalent to that contained in fruits. (The fruit can be used as a dietary supplement to counteract prolonged exposure to metals in population in industrial areas.)

The fruits are reported to activate trypsin (proteolytic enzyme) activity.

The fruits can be used as coagulant in the treatment of water and can purify low turbidity water.

The fruits can be consumed safely all round the year.

Dosage ▶ Fresh fruit—10–20 g; pulp juice—5–10 ml. (*API* Vol. I.)

Emilia sonchifolia (L.) DC.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Throughout India, ascending to 1,350 m in the hills.

Ayurvedic ▶ Shash-shruti (non-classical).

Unani ▶ Hirankhuri.

Folk ▶ Sadamandi.

Action ▶ Plant—sudorific, febrifuge, antiseptic. Used in infantile tympanitis and bowel complaints. Root—antidiarrhoeal. Leaf—used for otitis media under medical supervision.

The aerial parts contain pyrrolizidine alkaloids, senkirkine and doronine. Presence of simiaral, beta-sitosterol, stigmasterol, palmitic and triacontannic acids is also reported.

Enhydra fluctuans Lour.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Hills of Bihar, West Bengal and Assam.

English ▶ Marsh Herb, Water Cress.

Ayurvedic ▶ Hil-mochikaa.

Folk ▶ Harakuch.

Action ▶ Leaf—antibilious, laxative, demulcent, antidermatosis. Used in dyspepsia, diseases of the nervous system and cutaneous affections.

The plant is a good source of beta-carotene (3.7–4.2 mg/100 g fresh basis) which is lost during cooking. Used as a leafy vegetable.

Enicostemma littorale auct. non-Bl.

Synonym ▶ *E. hyssopifolium* (Willd) I. C. Verdoorn.
E. axillare (Lam.) Raynal.
Exacum hyssopifolium Willd.
Adenema hyssopifolium G. Don.

Family ▶ *Gentianaceae.*

Habitat ► Throughout India, from Punjab and Gangetic Plain to Kanyakumari up to 500 m.

English ► Indian Gentian.

Ayurvedic ► Naagjhvaa, Maamajjaka, Naahi, Tikshnapatra.

E

Unani ► Naai, Naahi.

Siddha/Tamil ► Vellargu.

Folk ► Chhotaa Chirayataa.

Action ► Bitter tonic, carminative, blood purifier, antirheumatic, anti-inflammatory, antipsychotic, anthelmintic, cardiostimulant.

The plant is used as a substitute for *Swertia chirayita*, and is reported to be effective against malaria. The plant contains ophelic acid which is also present in chiretta as a hydrolytic product of chiratin. The root extract showed antimalarial activity both *in vitro* and *in vivo*.

Whole plant gave alkaloids—gentianine, erythrocentaurin, enicoflavine and gentiocrucine; flavonoids—apigenin, genkwanin iso-vitaxin, swertisin, saponarin and 5-O-glucoside derivatives of sylwertisin and isoswertisin; glucosides—swertiamarin, a triterpene betulin. Swertisiode exhibited hypotensive activity.

The plant extracts inhibited carrageenan-induced oedema and its anti-inflammatory activity was found comparable to that of hydrocortisone.

Enicostema verticellatum Blume, the smallar var. of Kiryaata, is also equated with Vellargu (Siddha/Tamil).

Dosage ► Whole plant—3–5 g powder; 50–100 ml decoction. (*CCRAS*.)

Entada scandens
auct. non-Benth.

Synonym ► *E. phaseoloides* Merrill.
E. pursaetha DC.
Mimosa entada Linn.

Family ► *Momosaceae.*

Habitat ► Eastern Himalayas, hills of Bihar, Orissa and South India.

English ► Garbee Bean, Mackay Bean, Elephant Creeper.

Ayurvedic ► Gil.

Siddha/Tamil ► Chillu, Vattavalli.

Folk ► Gil-gaachh.

Action ► Seed—carminative, anodyne, spasmolytic bechic, anti-inflammatory, anthelmintic, antiperiodic. Used in liver complaints, glandular swellings, debility, skin diseases. The seed, stems and bark are poisonous. A paste of the seeds is applied locally for inflammatory glandular swellings. The juice of wood and bark is used as an external application for ulcers. The leaves are reported to be free from the toxic saponins. After soaking in water and roasting toxic principles can be removed from the white kernels of the seeds.

The seeds gave saponins of entagenic acid; a triterpenoid glucoside entanin; beta-sitosterol, alpha-amyrin, quercetin, gallic acid, cyamidin chloride, lupeol and a saponin mixture which gave prosapogenin A. Entanin exhibits antitumour activity. It inhibits Walker 256 tumours in rats without deaths.

Entadamide A (the sulphur-containing amide from the seed) is a 5-lipo-

xygenase inhibitor and is found to be effective in the treatment of bronchial asthma. The bark is used for hair wash.

Entagenic acid, a sapogenin of entada saponin IV, imparts antifungal activity to the bark.

Ephedra gerardiana Wall. ex Stapf.

Family ► *Ephedraceae.*

Habitat ► The drier regions of the temperate and alpine Himalayas from Kashmir to Sikkim from 2,350 to 5,350 m.

English ► Ephedra (*Ephedra sinica* Stapf.)

Ayurvedic ► Soma, Soma-valli (substitute).

Folk ► Asmaaniyaa, Budaagur (Punjab); Tipat, Traani (Himalayan region).

Action ► Circulatory stimulant, bronchodilator, vasodilator, antiallergic, antiasthmatic (usualy given with expectorants), diaphoretic. Not prescribed with antidepressants.

Key application ► *Ephedra sinica*—in diseases of the respiratory tract and mild bronchospasms. Also in acute coryza, allergic rhinitis and sinusitis. (*German Commission E.*) In the treatment of nasal congestion due to hay fever, allergic rhinitis, acute coryza, cold, sinusitis and as a bronchodilator. (*WHO.*)

Contraindicated in anxiety, restlessness, high blood pressure, glucoma, impaired circulation of the cerebrum, adenoma of prostate with residual urine accumulation, pheochromocytoma, thyrotoxicosis. (*German Commission E.*)

Ephedra is official in the national pharmacopoeias of China, Japan and Germany. The herb is listed in *Ayurvedic Pharmacopoeia*. Only its isolated derivatives, ephedrine and ephedrine hydrochloride are official in *Indian Pharmacopoeia*.

Ephedrine is toxic at more than 300 mg in 1 day (Francis Brinker.)

Aerial parts yielded ephedrine and ephedroxane. Pseudoephedrine is the most active anti-inflammatory principle of *Ephedra* sp., it exhibited inhibitory action on a number of acute inflammations. Ephedroxane possesses a minor anti-inflammatory principle. Among the Indian species, *Ephedra major*, found in Lahul, contains over 2.56% alkaloids of which nearly three fourths is ephidrine. *Ephedra gerardiana* contains 1.22% total alkaloids and 0.68% ephedrine.

On 30 December 2003, the FDA banned ephedra products in the US.

Equisetum arvense Linn.

Family ► *Equisetaceae.*

Habitat ► The Himalayas at high altitudes.

English ► Field Horsetail.

Ayurvedic ► Ashwa-puchha (non-classical).

Action ► Haemostatic, haemopoietic, astringent, diuretic. Used for genito-urinary affections (urethritis, enuresis, cystitis, prostatitis),

internally as an antihaemorrhagic and externally as a styptic.

The ashes of the plant are beneficial in acidity of the stomach and dyspepsia.

Key application ► Internally in irrigation therapy for post-traumatic and static inflammation, and for bacterial infections and inflammation of the lower urinary tract and renal gravel.

The British Herbal Compendium reported weak diuretic, haemostyptic, vulnerary and mild leukocytosis causing actions.

The haemostatic substance has been shown to act orally, it has no effect on blood pressure and is not a vasoconstrictor.

The herb contains 10–20% minerals, of which over 66% are silicic acids and silicates; alkaloids, including nicotine, palustrine and palustrinine; flavonoids, such as iso-quercitrin and equicertin; sterols, including cholesterol, isofucosterol, campesterol; a saponin equisitonin, dimethyl-sulphone, thiaminase and aconitic acid. Diuretic action of the herb is attributed to its flavonoid and saponin constituents, Silicic acid strengthens connective tissue and helps in healing bones.

Erigeron canadensis Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Punjab, Upper Gangetic Plain, Assam, Western Ghats and Western Himalayas.

English ► Canadian Fleabane.

Ayurvedic ► Jaraayupriya, Makshikaa-visha, Palit (non-classical).

Action ► Astringent, haemostatic, antirheumatic, diuretic. Used for diarrhoea, kidney disorders, bronchitis and for bleeding piles, wounds, bruises. Essential oil—used in bronchial catarrh and cystitis.

The extracts of the plant gave sesquiterpenes, beta-santalen, beta-himachalene, cuparene, alpha-curcumene, gamma-cadinene.

The petroleum ether and ethanolic extracts of aerial parts exhibit significant anti-inflammatory activity.

Aqueous extract of powdered plant produces fall in blood pressure, depresses the heart and increases respiration in animals.

The essential oil, obtained from aerial parts in Japan, is found to contain 47 volatile compounds of which 91.0% are terpenoids. The leaves contain cumulene derivatives.

For preparing plant extract as a drug, the volatile oil is removed from a hot aqueous extract and the residue is filtered and concentrated to 24% or 60% of dry matter content. The 6% dry matter extract contains flavones 0.83, tannins 0.52, reducing sugars 6.37 and total sugars 12.6%. The extract is anti-inflammatory, analgesic, bactericidal and fungicidal.

Eriobotrya japonica Lindl.

Family ► *Rosaceae.*

Habitat ► Native to China; now cultivated mainly in Saharanpur, Dehradun, Muzaffarnagar, Meerut, Kanpur, Bareilly districts of Uttar Pradesh, Amritsar, Gurdaspur and Hoshiarpur districts of Punjab.

English ► Loquat, Japanese Medlar.

Ayurvedic ► Lottaaka (non-classical).

Unani ► Lokaat.

Siddha ► Ilakotta, Nokkotta (Tamil).

Action ► Leaves—used in China and India for the treatment of diabetes mellitus and skin diseases. Fruit—sedative, antiemetic. Flower—expectorant.

The plant contains lipopolysaccharides (LPS), which exhibit antirheumatic activity. LPS is also found useful for treating diabetes mellitus and lowering high cholesterol level. The ethanolic extract of the leaves showed anti-inflammatory activity on carrageenan-induced oedema in rats and significant hypoglycaemic effect in normal rabbits like the standard drug tolbutamide. The sesquiterpene glycoside and polyhydroxylated triterpenoids showed a marked inhibition of glycosuria in genetically diabetic mice; also reduced blood glucose level in normoglycaemic rats. The hypoglycaemic effect is mediated through the release of insulin from pancreatic beta cells.

The leaves gave ionone-derived glycosides and triterpenes. Maslinic and ursolic acids have also been isolated. Maslinic acid possesses significant anti-inflammatory activity. It also exhibits inhibitory effect on histamine-induced contraction in isolated ileum of guinea pig.

Hot aqueous extract of the leaves showed hepatoprotective activity experimentally.

The leaves yield an essential oil containing nerolidol (61–74%).

The presence of an antifungal compound, eriobofuran, is also reported.

The methanolic extract of the plant exhibits antioxidant and radical scavenging activity.

Eruca sativa Mill.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Cultivated in Uttar Pradesh, Punjab, Delhi and Madhya Pradesh.

English ► Rocket-Salad.

Ayurvedic ► Tuvari, Tuvarikaa, Shveta-sursaa, Bhuutaghna, Darad-harsha, Siddaartha.

Unani ► Jirjeer, Taraamiraa.

Folk ► Safed Sarson.

Action ► Tender leaf—stimulant, stomachic, diuretic, antiscorbutic, rubefacient. Seed—vesicant, antibacterial.

Seeds and fresh plant gave glucoerucin (4-methylthiobutyl glucosinolate); leaves yielded iso-rhamnetin-3-glucoside and iso-rhamnetin. The volatile oil of the seeds contains isothiocyanate derivatives. The oil at 0.004 and 0.008 ml/kg exhibits diuretic activity. The ethanolic extract of the seeds is diuretic at 20 and 40 mg/kg Seeds are used to induce vomiting in place of ipecac.

Crude juice of the plant inhibited *E. coli, S. typhi* and *B. subttis.*

For eating purposes, the plant should be gathered before flowering; for medicinal use when in flower.

Ervataemia coronaria staff.

Synonym ▶ *E. divaricata* (L.) Alston. *Tabernaemontana coronaria* R.Br.

Family ▶ *Apocynaceae.*

Habitat ▶ Throughout the sub-Himalayan tract from Garhwal eastwards to Assam and Bengal, extending southwards to North Circars.

English ▶ East Indian Rosebay.

Ayurvedic ▶ Nandivrksha, Tagar.

Siddha/Tamil ▶ Nandiyaavattam.

Action ▶ Topically anodyne; chewed for relief of toothache; administered as a vermicide. Various parts of the plant are used in the indigenous system of medicine for skin diseases and cancer.

The plant from Sri Lanka and Pakistan contains several indole alkaloids, including voacristine.

Isovoacristic hydrochloride caused bradycardia in frogs and rabbits. The decoction of leaves exhibits antihypertensive and diuretic activity. Tabersonine, reported in the flowers, showed hypotensive effect on anaesthetized cats.

The most abundant alkaloids in stem cortex are tabernaemontanine, dregamine and 20-*epi* ervatamine.

Erycibe paniculata Roxb.

Family ▶ *Convolvulaceae.*

Habitat ▶ Throughout India, common in Uttar Pradesh.

Ayurvedic ▶ Ashoka-rohini (non-classical).

Siddha/Tamil ▶ Unamkodi.

Action ▶ Bark—anticholerin. Ripe fruit eaten in constipation. Pounded root prescribed internally in fever. Bark is used in cholera.

EtOH (50%) extract of aerial parts exhibit diuretic and hypotensive activity.

Eryngium caeruleum Bieb.

Family ▶ *Umbelliferae; Apiaceae.*

Habitat ▶ Kashmir and Western Himalayas.

Folk ▶ Pahaari Gaajar, Dudhali (Punjab), Saleli-misri.

Action ▶ Root—nervine, stimulant, haematinic, diuretic, diaphoretic, expectorant. Ash of the plant—antiseptic, anti-inflammatory (used in haemorrhoids).

Leaves and flowers contain *d*-mannitol. Underground parts yield saponins.

Eryngium foetidum Linn.

Family ▶ *Umbelliferae; Apiaceae.*

Habitat ▶ Assam up to 1,700 m, found as a garden plant in Dehra Dun.

English ▶ Sea Holly.

Folk ► Brahma-Dhaniyaa, Jangali Gaajar (var.).

Action ► Root—stomachic. Plant—galactagogue, diuretic. Fresh leaves are used as a vegetable and flavouring agent.

Hot aqueous extract of the plant possesses anticonvulsant property. The ethanolic extract (50%) of aerial parts showed cardiovascular, diuretic and antistrychnine activity. The plant is CVS an CNS active and hypothermic.

Sea Holly, found in sandy soils near the sea in Britain and Europe, is equated with *Eryngium maritimum* Linn.

The root possesses diuretic and anti-inflammatory properties and is used for urinary tract infections (urethritis, cystitis, polyurea, renal colic, prostatic affections).

The root gave coumarins, saponins, flavonoids, plant acids and polyphenolic acids. Saponins are haemolytic, rosmarinic acid is known for its anti-inflammatory activity.

Erythraea roxburghii G. Don.

Synonym ► *Centaurium roxburghii* (G. Don) Druce.

Family ► *Gentianaceae.*

Habitat ► Sub-tropical and temperate regions.

Ayurvedic ► Kiraat-tikta (related species), Yavatiktaa (related species) (A substitute for *Swertia chirayita*.)

Folk ► Khet-chiraayataa.

Action ► Bitter tonic.

Key application ► *Erythraea centaurium*—in loss of appetite and peptic discomfort. (*German Commission E.*)

Erythrina indica Lam.

Synonym ► *E. variegata* Linn. var. *orientalis* (Linn.) Merril.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Grown as an ornamental.

English ► Indian Coral tree.

Ayurvedic ► Paaribhadra, Paaribhadraka, Paarijaataka, Mandaara, Dadap. Kantaki-palaasha, Kantkimshuka, Raktapushpa; Nimbataru. (*Erythrina suberosa* Roxb. is also equated with Paaribhadra.)

Siddha/Tamil ► Kaliyanamurukkan.

Folk ► Farhad.

Action ► Leaf—cathartic, diuretic, antiseptic, anti-inflammatory. Applied externally for dispersing venereal buboes. Bark—antibilious, anthelmintic, febrifuge, astringent, expectorant. (*E. variegata* is an adulterant to the Ayurvedic drug Rohitaka.) Different parts of the plant are used as nervine sedative, antiepileptic, astringent, antiasthmatic and antiseptic. Bark is used in liver ailments, fever and rheumatism.

A number of tetracyclic alkaloids have been isolated from the plant.

The alkaloids showed a muscle relaxant activity and increased the sedative effects of hexabarbital. The alkaloids extracted from the leaves are re-

ported to have anti-inflammatory activity. Bark alkaloids are neuromuscular blocking, smooth muscle relaxant, CNS depressant, hydrocholeretic and anticonvulsant. The bark contains 0.05% alkaloids.

E

The root extracts exhibited antimicrobial activity *in vitro* against *Staphylococcus aureus* and *Mycobacterium smegmatis*.

The seeds of many of the species of *Erythrina* contain alkaloids with curare-like activity. Clinical trials on biologically standardized beta-erythroidine hydrochloride and dihydro-beta-erythroidine hydrochloride have shown promising results in the treatment of conditions involving certain types of muscular rigidity.

Dosage ▶ Stem bark—6–12 g powder; 12–24 g for decoction. (*API* Vol. II.)

Erythrina stricta Roxb.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Assam, Manipur, West Bengal and South India.

Ayurvedic ▶ Muraa (controversial).

Siddha/Tamil ▶ Mullu-murukku.

Action ▶ Bark—antibilious, antirheumatic, febrifuge, antiasthmatic, antiepileptic, antileprotic. Flowers—antidote to poison. In Assam, the juice of the root bark is given to children in threadworm infection.

The plant gave tetracyclic alkaloids—(+)-erythraline and (+)-erythrinine.

Erythroxylum coca Lam.

Family ▶ *Erythroxylaceae.*

Habitat ▶ Indigenus to Peru and Bolivia, introduced and experimentally cultivated in Assam, West Bengal, Bihar, Uttar Pradesh, Tamil Nadu and Kerala.

English ▶ Coca, Cocaine Plant.

Siddha/Tamil ▶ Sivadari.

Action ▶ Mydriatic and toxic. (Coca leaf extract, after removing cocaine, is used as a flavouring agent for soft drinks. Maximum use level: 0.055%.)

Coca leaves contain a large number of alkaloids including cocaine, tropacocaine, cinnamoylcocaine, truxillines and benzoylecgonine. (alkaloid content varies from 0.5 to 1.5%). The bark and seeds also contain cocaine.

Coca is subject to restrictions in most countries.

Not to be confused with Cocoa seed (*Theobroma cacao.*)

Erythroxylum monogynum Roxb.

Synonym ▶ *E. indicum* (DC.) Bedd.

Family ▶ *Erythroxylaceae.*

Habitat ▶ South India, up to 1,000 m.

English ▶ Bastard Sandal, Red Cedar.

Ayurvedic ▶ Kattuchandanam (Kerala).

Siddha/Tamil ▶ Devadaram.

Folk ▶ Gandh-giri (Maharashtra).

Action ► Leaf—diaphoretic, stimulant, diuretic, stomachic. A decoction is used for malarial fever. Bark and wood—febrifuge.

The wood yields diterpenes, including monogynol, OH-ogynol, devadarool; *d*-hibaene, its epoxide and an olefinic hydrocarbon.

Biological activity of the plant is hypothermic and CNS active.

Eucalyptus globules Labill.

Family ► *Myrtaceae.*

Habitat ► Native to Australia; now cultivated mainly at the hill-stations of India.

English ► Blue-Gum tree, Australian Gum tree.

Ayurvedic ► Tilaparna, Tailaparna, Sugandhapatra, Haritaparna Neelaniryaasa, Tribhandi, Triputaa, Saralaa, Suvahaa, Rechani, Nishotraa.

Unani ► Neelgiri oil.

Siddha/Tamil ► Karpooramaram.

Action ► Essential oil from leaves—antiseptic, antibiotic, antiviral, antifungal, antispasmodic, decongestant, antiasthmatic, expectorant, antirheumatic, diaphoretic. Used in chronic, bronchitis, migraine, congestive headache, neuralgia and ague, as an inhalant or internal medicine. Root—purgative.

Key application ► Leaf tea for catarrhs of the respiratory tract. Oil used externally for rheumatic complaints, contraindicated internally in inflammatory diseases of the gastrointestinal tract, bile ducts, and in severe liver diseases. (*German Commission E.*) Oil—internally as adjuvant treatment of chronic obstructive respiratory complaints, including bronchitis and bronchial asthma, also for symptomatic relief of colds and catarrh of the upper respiratory tract; externally for symptomatic treatment of colds and rheumatic complaints. (*ESCOP.*) Leaf—antiseptic. (*The British Herbal Pharmacopoeia.*)

E. globulus is the main commercial source of Eucalyptus leaf oil; yield is 2.12%; 1,8-cineole exceeds 70% (pharmaceutical grade oil requires a minimum cineole content of 70%).

Several potent euglobals, having closely related acyl-phloroglucinol-monoterpene (or sesquiterpene) structures, are isolated from the leaves and flower buds. These compounds showed strong granulation-inhibiting activity and inhibition of TPA induced EBV (*Epstein-Barr Virus*) activation.

Phloroglucin derivatives, isolated from leaves, showed better anti-inflammatory activity than indomethacin.

Natural antioxidants have also been isolated from the plant.

Dosage ► Leaf—50–100 ml infusion. (*CCRAS.*)

Eugenia uniflora Linn.

Family ► *Myrtaceae.*

Habitat ► Native to South America; cultivated in gardens; now naturalized in some parts of In-

dia at medium elevations under sub-tropical conditions.

English ► Pitaanga, Surinam Cherry.

Action ► Fruit—used as a source of carotenoids (225.9 mcg/g) and provitamin A (991 RE/100g). Leaves—diuretic, antirheumatic, antifebrile. Used for lowering blood pressure, blood cholesterol, uric acid level, also for reducing body weight. Essential oil— digestive, carminative.

The leaves gave flavonoids, quercitrin, quercetin, myricitrin and myricetin as major constituents.

The bark contains 28.5% tannins.

Eulaliopsis binata (Retz.) C. E. Hubbard.

Synonym ► *Pollinidium angustifolium* Haines.

Family ► *Gramineae; Poaceae.*

Habitat ► Many parts of North India.

English ► Baib grass, Sabai grass.

Ayurvedic ► Balvaja.

Folk ► Bhaabar.

Action ► Diuretic. Used for treating lithiasis.

EtOH (50%) extract of the plant is sasmogenic.

Eulophia campestris Wall.

Family ► *Orchidaceae.*

Habitat ► Throughout greater part of India, mostly in the plains.

Ayurvedic ► Amrita, Sudhaa-muuli, Munjaataka (Salep var.) Saalam-misri (substitute). Munjaataka and Saalam-misri have been equated with *Orchis latifolia* Linn. of the same family.

Action ► Tubers—used in stamatitis, purulent cough and as a cardiac and nervine tonic. Also used in scrofulous diseases and dyscrasia. Used a substitute for Salep.

Eulophia herbacea Lindl.

Family ► *Orchidaceae.*

Habitat ► Western Himalayas, Bengal and Western parts of Deccan Peninsula.

English ► Salep (var.).

Ayurvedic ► Munjaataka (substitute), Saalam-misri (substitute).

Action ► Tubers—used as a substitute for Salep.

Eulophia nuda Lindl.

Family ► *Orchidaceae.*

Habitat ► Tropical Himalayas from Nepal eastward to Assam, and in Deccan from Konkan southwards.

Ayurvedic ► Baalakanda, Amarkanda, Maalaakanda.

Folk ► Ambarkanda (Maharashtra).

Action ► Tubers—used for bronchitis, diseases due to vitiated blood, tumours, scrofulous glands. Also used as vermifuge.

The tubers yield two phenanthrene derivatives, eulophiol and nudol, along with *n*-hexacosyl alcohol and lupeol.

Eulophia pratensis Lindl.

Synonym ► *E. ramentaceae* Lindl. ex Wt.

Family ► *Orchidaceae.*

Habitat ► Pasture lands of Deccan from Konkan southwards.

English ► Salep (var.).

Folk ► Sataavari (Maharashtra).

Action ► Tuber—used for scrofulous glands.

Euonymus tingens Wall.

Family ► *Celastraceae.*

Habitat ► Tropical Himalayas from Simla to Bhutan between 2,150 and 3,200 m, and in Assam.

English ► Spindle Wood, Wahoo. (*Euonymus atropurpureus*, found in Eastern and Central USA and Canada, is equated with Wahoo and Spindle tree.

Ayurvedic ► Bhillotaka.

Folk ► Chopra, Mermahaul, Kunku, Barphali.

Action ► Cholagogue, laxative, diuretic, circulatory stimulant. Used for constipation, torpidity of liver, gall bladder disorders, jaundice and dyspepsia. Bark is used in diseases of the eye.

Key application ► Bark—as laxative. (*The British Herbal Pharmacopoeia.*)

The plant yielded triterpenes—epifriedelinol, taraxerol, dulcitol, pristimerin and tingenins A and B. Pristimerin exhibited antitumour activity.

Only bark and root bark is used medicinally. The seeds are poisonous.

Toxic constituents of *E. atropurpureus* are furan-a-carboxylic acid; *d*-phenyl-glucosone (sterol glucoside); euatroside; euatromonoside (steroid glycosides). (Francis Brinker.)

Eupatorium cannabinum Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► The temperate Himalayas up to 3,600 m and in Khasi Hills between 1,000 and 2,000 m.

English ► Hemp Agrimony, Water Hemp, Hemp Eupatorium.

Folk ► Bundaar (Maharashtra), Tongollati (Assam).

Action ► Diuretic, cathartic, anti-tumoral. Used under strict medical supervision for blood impurities and tumours. Internal administration is not advised unless the hepatotoxic alkaloids are shown to be absent from the sample.

The herb contains volatile oil (about 0.5%); sesqiterpene lactones, the major one being eupatoriopicrin; flavonoids, pyrrolizidine alkaloids; immunoactive polysaccharides.

Eupatoriopicrin has shown to be cytostatic as well as cytotoxic; it delayed

transplanted tumour growth in mice in a dose-dependent manner.

An aqueous extract of the plant exhibited anti-necrotic activity against carbon tetrachloride-induced hepatotoxicity in rats. The effect is attributed to the presence of flavonoids, rutoside, hyperoside and quercetin; phenolic acids, caffeic and chlorogenic; and not due to the presence of eupatoriopicrin.

Acrylic acid and the lactic, malic and citric acids, present in the plant, also exhibited protective effect against acute toxicity induced by ethanol in mice.

The polysaccharides have immunostimulatory activity and enhance phagocytosis in a number of immunological tests. The leaf oil is reported to exhibit fungicidal effect.

A related species, *Eupatorium odorum* Linn., is known as Gondri in Orissa.

Eupatorium triplinerve Vahl.

Synonym ▶ *E. ayapana* Vent.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Native to Brazil; naturalized in many parts of India; grown in gardens of Maharashtra.

English ▶ Ayapana Tea.

Ayurvedic ▶ Vishalyakarani, Ayaapaana.

Siddha/Tamil ▶ Ayapanai.

Folk ▶ Ayapani (Maharashtra).

Action ▶ Cardiac stimulant, laxative, emetic, expectorant, bechic, antiscorbutic, alterative. Used in ague, also in dyspepsia. Leaf—anticholerin, haemostatic.

The leaves contain ayapanin and ayapin, with pronounced haemostatic properties. The leaves also contain carotene and free vitamin C (25 mg/100 g); there is 100% increase in vitamin C content on frying the leaves in oil.

A aqueous extract of dried leaves and shoots exhibits cardiac stimulant activity, increasing the force of the heartbeat but diminishing its frequency.

The plant is comparable to chamomile (*Anthemis* sp.).

Euphorbia antiquorum Linn.

Family ▶ *Euphorbiaceae.*

Habitat ▶ The warmer regions of India; often cultivated for hedges.

English ▶ Triangular Spurge.

Ayurvedic ▶ Snuhi (Substitute), Vajra-kantaka, Vajratundi

Siddha/Tamil ▶ Chathurakkali.

Folk ▶ Tridhaari, Tidhaaraa Sehunda.

Action ▶ Latex—purgative. Applied on burns. Plant—used in dropsy, anasarca, sores, venereal sores, syphilis; also in dysentery, bronchitis, asthma. Root—anthelmintic. Fresh stems—used for skin sores and scabies. A decoction of stems is given in gout.

The stems yielded friedelan-3 alpha-ol and 3 beta-ol, taraxerol and taraxerone. The roots yielded taraxerol. Latex gave beta-amyrin, cycloartenol, euphol (70%) and alpha-euphorbol.

Euphorbia dracunculoides Lamk.

Family ► *Euphorbiaceae.*

Habitat ► Throughout India in the plains and low hills.

Ayurvedic ► Saatalaa, Saptalaa, Sapralaa, Viduraa, Charmasaahvaa, Charmakashaa.

Unani ► Thuhar.

Siddha/Tamil ► Tillakada, Thusimul-lai.

Folk ► Titali.

Action ► Fruit—removes warts topically. Plant extract—cholinergic. The aerial parts are used as a vegetable for maintaining smooth and regular movement of bowels.

The alcoholic and aqueous extracts of aerial parts showed significant action on gastro-intestinal motility in rats. The activity is more pronounced in alcoholic extract than in aqueous extract.

The extract of air-dried plant exhibits cholinergic action and direct stimulation of different muscle preparations. Plant gave euphorbol, surcose, glycosides, sterols and kaempferol.

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Euphorbia hirta Linn.

Synonym ► *E. pilulifera* auct. non Linn.

Family ► *Euphorbiaceae.*

Habitat ► Throughout warmer regions of India.

English ► Euphorbia, Australian Asthma Weed, Pill-bearing Spurge.

Ayurvedic ► Dudhi, Dudhikaa, Naagaarjuni, Vikshirini.

Unani ► Dudhi Khurd.

Siddha/Tamil ► Amman pachharisi.

Action ► Pectoral, antiasthmatic, antispasmodic. Used for asthma, laryngitis, chronic nasal and bronchial catarrh; diarrhoea, dysentery, intestinal parasitosis Also used in postnatal complaints, failure of lactation. Latex—vermifuge. Used in diseases of urinogenitory tract.

The herb contains several terpenes, anthocyanins, alcohols and steroids. Aerial parts also gave shikimic acid, choline, L-inositol and free sugars.

Antiasthmatic activity is attributed to choline and shikimic acid. Shikimic acid and choline showed relaxant and contracting properties on guinea-pig ileum.

The aqueous extract of the herb exhibited sedative, anxiolytic, analgesic, antipyretic and anti-inflammatory activities; exerted an inhibitory effect on platelet aggregation.

Quercitrin is reported to be responsible for antidiarrhoeal activity.

Methanolic extract of the leaves exhibits antibacterial and antifungal activities.

Dimeric hydrolysable tannins, euphorbains, have been isolated from the plant.

E

Euphorbia hypericifolia auct. non Linn.

Synonym ▶ *E. indica* Lam.

Family ▶ *Euphorbiaceae.*

Habitat ▶ Throughout warmer regions of India, up to 1,500 m in the Himalaya.

Ayurvedic ▶ Dugdhikaa.

Action ▶ Plant—used in colic, diarrhoea and dysentery. Leaf—astringent, antidysenteric, antileucorrhoeic (also used in menorrhagia).

The plant contains taraxerol, octacosanol, campesterol, stigmasterol, beta-sitosterol, quercetin, quercitrin, ellagic acid, rhamnetin-3-galactoside, rhmnetin-3-rhamnoside and kaempferol.

Euphorbia neriifolia auct. non Linn.

Synonym ▶ *E. ligularia* Roxb.

Family ▶ *Euphorbiaceae.*

Habitat ▶ Grown as a field and boundary fence and as curious on rockeries in gardens.

English ▶ Holy Milk Hedge, Dog's Tongue.

Ayurvedic ▶ Snuhi, Samant-dugdhaa, Sehunda, Singhtunda, Snuk, Gudaa, Sudhaa, Vajra, Vajjri, Vajjradram, Thuuhar.

Siddha/Tamil ▶ Ielaikkali, Perumbukalli.

Action ▶ Latex—purgative, diuretic, antiasthmatic, expectorant, rubefacient. Used in ascites, polyuria, anasarca, chlorosis, tympanitis; externally on warts, cutaneous eruptions, scabies, unhealthy ulcers.

A succus compounded of equal parts of the juice and simple syrup is said to be used for giving relief in asthma.

The triterpenoids, euphol, 24-methylenecycloartenol, euphorbol hexacosonate, glut-5 (10)-en-1-one, glut-5-en-3 beta-yet-acetate, taraxerol, friedelan-3 alpha-ol and –3 beta-ol have been reported from the plant.

Euphorbia nivulia Buch.-Ham.

Family ▶ *Euphorbiaceae.*

Habitat ▶ Northern and central India, often planted in dry areas.

Ayurvedic ▶ Snuhi (substitute), Patra-Snuhi.

Siddha/Tamil ▶ Kalli, Naga-kalli.

Action ▶ Latex—used for treating jaundice, dropsy, enlargement of liver and spleen; colic; syphilis, leprosy; applied to haemorrhoids. Coagulated latex is used for bronchitis. Leaf—juice is used as a purgative. Warmed in mustard oil, applied in cold and headache.

The latex gave cycloart-25-en-3 beta-ol, and cyclolaudenol; stem contained cyclolaudenol and sitosterol; leaves gave sitosterol. (None of these triterpenes have been reported from *E. neriifolia*.) These triterpenes exhibited antimicrobial activity against *Staphylococcus aureus* and *E. coli.*

Euphorbia pilosa Linn.

Family ► *Euphorbiaceae.*

Habitat ► Western Himalayas from Garhwal, westwards to Kashmir.

Ayurvedic ► Saatala, Saptalaa. (Substitute).

Action ► Purgative, emetic. Root—used in fistulous sores.

Prostratin, isolated from the roots of var. *cornigeria* Hook. f., was found to be pro-inflammatory.

Euphorbia resinifera Berg.

Family ► *Euphorbiaceae.*

Habitat ► Native to Morocco.

English ► Euphorbium.

Unani ► Farfiyuun, Afarbiyuun.

Action ► A drastic purgative, irritant, vesicant and toxic, pro-inflammatory. Internal use of the drug has been abandoned.

Dried latex gave diterpene esters; derivatives of 12-deoxyphorbol, which are pro-inflammatory, tumour promoting and cause platelet aggregation; exhibit co-carcinogenic activity.

Euphorbia royleana Boiss.

Family ► *Euphorbiaceae.*

Habitat ► Western Himalaya from Kumaon to Nepal.

Ayurvedic ► Snuhi, Snuk, Sehunda, Gudaa (Substitutes.) (Adhogudaa of Ayurvedic medicine and Banamuuli of folk medicine have been equated with *Euphorbia acaulis* Rox.)

Unani ► Thuuhar

Folk ► Thor, Surai.

Action ► Latex—cathartic, anthelmintic.

The latex yield euphol, cycloeucalenol, an inseparable mixture of four tetra-and four tri-esters of macrocyclic diterpene ingenol, octacosanol, tetracosanol, beta-sitosterol, stigmasterol, alpha-amyrin and campesterol. The plant gave ingenol.

The latex is a valuable source of ingenol esters. Ingol is a macrocyclic diterpene and is of therapeutic interest due to its antileukemic properties. Fractionation of the latex gave ingol-12-acetate and 8-tigloyl-12-acetate. The acylation of ingol-12-acetate yielded derivatives which inhibit the growth of the basophilic leukaemia cells in rats.

Euphorbia thomsoniana Boiss.

Family ► *Euphorbiaceae.*

Habitat ► Kashmir, above 2,350 m.

Ayurvedic ► Hiyaavali, Svarnakshiri (also equated with *Argemone mexicana* L., *Papaveraceae.*), Kanchanakshiri, Pitadugdhaa, Katuparni.

Folk ► Hiravi (Kashmir). Titari (Himachal Pradesh).

Action ► Root—purgative. Latex—used in eruptions and other skin diseases.

Dosage ► Latex—125–250 mg (*CCRAS.*)

Euphorbia thymifolia Linn.

E

Family ► *Euphorbiaceae.*

Habitat ► Smaller var., equated with *E. thymifolia*, is found in tropical plains and low hills of India, ascending to 1,750 m. Bigger var., *E. pilulifera/E. hirta* Linn. is found in warmer parts of India from Punjab eastwards, and southwards to Kanyakumari.

Ayurvedic ► Dudhi (smaller var.), Dugdhikaa, Naagaarjuni, Swaaduparni.

Siddha/Tamil ► Sittrapaladi.

Action ► Plant—antispasmodic, bronchodilator, antiasthmatic (used in bronchial asthma), galactagogue (also used for spermatorrhoea). Root—used in amenorrhoea. Latex—used in ringworm, dandruff. Leaf, seed and latex—purgative. A decoction of the plant, with honey, is given to treat haematuria.

Aerial parts gave epitaraxerol, *n*-hexacosanol, euphorbol, two derivatives of deoxyphorbol-OAC, 24-methylene cycloartenol and quercetin galactoside. Co-carcinogenic activity is due to phorbol derivatives. The plant exhibits antimicrobial activity due to alkaloids.

Dosage ► Whole plant—10–20 g paste. (*CCRAS.*)

Euphorbia tirucalli Linn.

Family ► *Euphorbiaceae.*

Habitat ► Native to Africa; naturalized in the warmer parts of India.

English ► Milk-Bush, Milk Hedge, Indian tree Spurge, Aveloz, Petroleum Plant

Ayurvedic ► Saptalaa, Saatalaa.

Siddha/Tamil ► Tirukalli.

Folk ► Angulia-thuuhar.

Action ► Purgative, emetic, antiasthmatic, bechic. Used for whooping cough, asthma, dyspepsia, biliousness, jaundice, enlargement of spleen, leucorrhoea. Latex—applied externally on warts.

Used as a purgative and for rheumatism and neuralgia. Stem bark—used for gastralgia, colic, asthma.

The latex contains an ingol ester besides triterpenoids, euphorbinol and cycloeuphordenol.

Presence of a number of ingenol and phorbol esters (diterpenoids), and triterpenoids are reported from the plant. The stem gave hentriacontane, hentriacontanol, beta-sitosterol, Me-ellagic and ellagic acids and kaempferol glucoside.

The latex is a weak tumour promoter.

Euphoria longan Steud.

Family ► *Sapindaceae.*

Habitat ► South India, Assam and Bengal.

English ► Longan

Ayurvedic ► Aakshiki (non-classical).

Siddha/Tamil ► Puvatti, Shempuvan.

Folk ► Aashaphala (Bengal), Naaglichi (Assam).

Action ► The aril of the fruit is used in prescriptions of Chinese traditional medicine for treating insomnia, neurosis, palpitation, amnesia and anaemia.

It has been found to ameliorate the impaired learning process in mice.

An aqueous extract of the fruit pulp showed stimulating effect on superoxide dimutase activity in red blood cells of mice., indicating its possible use in delaying the aging process.

The seeds contain antimutagens, amino-hydroxy-hexynoic acid, hypoglycin A (which causes hypoglycaemia) and amino-hydroxy-heptynoic acid.

Euphrasia simplex D. Don.

Synonym ► *E. officinalis* Linn.

Family ► *Scrophulariaceae.*

Habitat ► The Temperate Himalaya from Kashmir to Sikkim, from 1,350 to 4,000 m.

English ► Eyebright.

Action ► Plant—astringent, antiallergic, bechic, anticatarrhal.

Key application ► Externally as lotions, eye-baths, poultices, for eye complaints associated with inflammatory conditions, and as a preventive measure against mucus of the eyes, "glued" and inflammed eyes. (Traditional uses mentioned by *German Comission E.*)

Orally, Eyebright is used to treat allergies, common cold, bronchial conditions and sinusitis. Ophthalmic application is not recommended. Eyebright has been used in a British herbal tobacco product, which was smoked for cold and chronic bronchial conditions.

Aerial parts showed presence of phenol, carboxylic acid, flavones and methyl flavone derivatives. Plant gave quercetin glucoside, diosmetin, kaempferol, caffeic and ferulic acids, stigmasterol and beta-sitosterol. Iridoid glycosides, including aucubin, are also present. Tannins include both condensed and hydrolysable gallic acid type.

Euryale ferox Salisb.

Family ► *Nymphaeaceae.*

Habitat ► Kashmir, Bihar, Rajasthan, Assam, Manipur, Tripura, Bengal and Uttar Pradesh, in lakes and ponds.

English ► Gorgan Nut, Fox Nut.

Ayurvedic ► Makhaann, Paaniyaphala, Padma-bijaabha, Ankalodya.

Unani ► Makhaanaa.

Action ► Seed—deobstruent, astringent, nervine tonic. Used in spermatorrhoea and sexual affections (restrains seminal gleet) and debility.

Edible parts of the seeds gave the following values: moisture 12.8, protein 9.7, fat 0.1, mineral matter 0.5, carbohydrates 76.9, calcium 0.02, and phosphorus 0.09%; iron 1.4 mg/100 g.

E

Evolvulus alsinoides Linn.

Synonym ► *E. hirtus* Lam.
E. angustifolius Roxb.
Convolvulus alsinoides L.

Family ► *Convolvulaceae.*

Habitat ► Throughout India, as a common weed in open and grassy places; ascending to 2,000 m in the Himalayas.

Ayurvedic ► Shankapushpi (blue-flowered var., *Convolvus pluricaulis*: white-flowered var.)

Unani ► Shankhaahuli.

Siddha/Tamil ► Vishnukrandi (blue-flowered), Shivakrandi (white-flowered).

Action ► Brain tonic, an aid in conception, astringent, antidysenteric. Leaf—antiasthmatic. Used in nervine affections (epilepsy, insanity, spermatorrhoea), and duodenal ulcers, also for uterine affections. Flowers—used for uterine bleeding and internal haemorrhages. A decoction of the herb is given as a blood purifier.

The plant contains alkaloid evolvine, beta-sitosterol, stearic, oleic, linoleic acids, pentatriacontane and triacontane. The alkaloid evolvine exhibited powerful stimulant activity on respiration and blood pressure (possibly analeptic).

Aqueous extract of the petal showed antifungal property.

Evolvulus nummularius Linn.

Family ► *Convolvulaceae.*

Habitat ► A weed of grassy lawns.

Ayurvedic ► Aakhukarni, Muusaakarni (substitute for *Merremia emarginata* (Burm. f.) Hallier f., synonym *Ipomoea reniformis* Choisy).

Folk ► Muusaakaani, Chhinipatra (Bihar).

Action ► Weak sedative, anthelmintic.

Exacum bicolor Roxb.

Synonym ► *E. tetragonum* Roxb.
E. perrottetii Griseb.

Family ► *Gentianaceae.*

Habitat ► Upper Gangetic plains and tropical Himalaya, also in South India.

Ayurvedic ► Ava-chiraayataa (bigger var. of chiraayataa).

Folk ► Titakhana, Uudakiraayita (Maharashtra).

Action ► Stomachic,febrifuge, antifungal, bitter tonic.

The leaves gave apigenin, luteolin, vanillic, *p*-hydroxybenzoic, protocatechuic and *p*-coumaric acids.

A related species. *Exacum pedunculatum* L., found throughout India, ascending up to 1,000 m, is also used as a substitute for *Swertia chirayita* and *Gentiana lutea*. Pounded plant is applied externally in rheumatism and gout. It also gave luteolin, diosmetin and phenolic acids.

Excoecaria agallocha Linn.

Family ► *Euphorbiaceae.*

Habitat ► The coastal and tidal forests of India.

English ► Blinding tree.

Siddha/Tamil ► Kampetti, Tillai, Agil, Ambala-vrksham.

Folk ► Gevaa, Huraa (Maharashtra). Gangawaa.

Action ► Latex—antileprotic. The latex blisters the skin and is reported to cause blindness if it enters the eye. The juice, boiled in oil, is applied in rheumatism, paralysis and leprosy.

The leaves are toxic and contain gallo tannins (0.616 mg/g dry weight). Fresh twigs and bark contain a piscicidal component. The latex is biocidal.

Exogonium purga Benth.

Synonym ► *Ipomoea purga* Hayne.

Family ► *Convolvulaceae.*

Habitat ► Native to Amercia. Grows in Southern and Eastern India.

English ► Jalap.

Unani ► Jalaapaa.

Action ► Tuber—drastic hydragogue cathartic, acts briskly, causes watery evacuations. Overdoses produce hypercatharsis. Contraindicated in inflammatory conditions of the bowels. (The roots of *Operculina turpethum* synonym *Ipomoea turpethum* are used as a substitute for jalap.)

E

F

Fagonia cretica Linn.

Synonym ► *F. arabica Linn.* (Correct name for Indian sp. is *Fagonia schweifurthii* Hadidi. *F. bruguieri* DC. is not a synonym of *F. cretica*, according to CDRI.)

Family ► *Zygophyllaceae.*

Habitat ► Western India, upper Gangetic plains and Peninsular India.

Ayurvedic ► Dhanvayaasa, Dhanvayavaasa, Dhanvayaasaka, Duraalabhaa, Samudraantaa. Gaandhaari, Kachhuraa, Anantaa, Duhsparshaa. (*Alhagi pseudalhagi* is used as a substitute for *F. cretica.*)

Unani ► Dhamaasaa.

Action ► Astringent, antiseptic, blood-purifier and febrifuge. Applied to abscesses, scrofulous glands and wounds; also given as a prophylactic against smallpox. Bark—used for dermatosis Extract of aerial parts—antiviral, antiamphetaminic, spasmogenic. Plant ash—given to children suffering from anaemia.

The aerial parts contain several triterpenoid saponins which gave sapogenin, nahagenin, oleanolic acid. Aerial parts also gave diterpenes, fagonone and its derivatives, besides flavonoids.

The flavonoids, quercetin and kaempferol, isolated from the leaves and flowers, showed antimicrobial activity.

The fruits are rich in ascorbic acid.

Dosage ► Whole plant—50–100 ml decoction. (*CCRAS.*)

Fagopyrum esculentum Moench.

Family ► *Polygonaceae.*

Habitat ► Native to Central Asia; now grown as minor grain-crop in hilly regions of North India and the Nilgiris.

English ► Buckwheat.

Ayurvedic ► Kotu.

Folk ► Kutu, Phaapar.

Action ► Used for treating fragile capillaries, chilbains and for strengthening varicose veins. Used at a supporting herb for treating high blood pressure. Rutin is obtained from fresh or dried leaves and flowers. (Rutin is used in a variety of haemorrhagic conditions.)

The seed are commonly used in colic, choleraic diarrhoea and abdominal obstructions. Root decoction is used in rheumatic pains, lung diseases and typhoid; juice in urinary disorders. In China, used in pulmonary sepsis.

The plant is used as a venous and capillary tonic, and for alleviating venous stasis and vericose veins.

It is a potential source of rutin (yield 3–5%). The leaves and blossoms contain most of the rutin (80–90%).

Quercetin caused significant decrease in ulcer index in acute gastric ulcer with respect to control group in rats. Quercetin, rutin or kaempferol inhibited, in dose-dependent manner, gastric damage produced by acidified-ethanol in rats.

The plant also gave hyperoside and anthracene derivatives.

Buckwheat is a good source of lysine and other amino acids. The flour is reported to repress exogenous hypercholesterolemia and promotes accumulation of triglyceride in the liver of rats.

Seed oil exhibits antimicrobial activity against *Bacillus anthrasis*, *E.coli* and *Salmonella paratyphi*.

Whole plant, dried or green, can cause photosensitization.

Fagopyrum tataricum Gaertn.

Family ► *Polygonaceae.*

Habitat ► Cultivated in the Himalayas, especially in the colder parts of Ladakh, Zaskar and Western Tibet.

English ► Tatary Duckwheat.

Ayurvedic ► Ukhal.

Folk ► Kutu (var.).

Action ► See *F. esculentum*. Duckwheat is a better source of rutin than the common Buckwheat. It contains 45–80% more rutin than the latter, and maintains its high rutin content for a longer period.

Fagus sylvatica Linn.

Family ► *Fagaceae.*

Habitat ► Cooler regions of northern hemisphere. Distributed in Kulu and the Nilgiris.

English ► European Beech, Common Beech.

Action ► Seeds and fatty oil—used externally in skin diseases, rheumatism and gout. Seeds—poisonous. Saponins cause severe gastrointestinal symptoms. Leaves also contain saponins. Wood tar—antiseptic, analgesic; mixed with talc, used as a dusting powder for gangrene and bed sores.

Farsetia hamiltonii Royle.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Mediterranean region, eastwards to India and southwards to tropical Africa.

Folk ► Farid-booti (Punjab).

Action ► Antirheumatic.

Farsetia species contain a volatile oil which gave glucosinolates. Allylglucosinolate is the major constituent.

Farsetia jacquemontii Hook. f. Thoms.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Rajasthan and Northwestern parts of India.

Folk ► Farid-booti.

Action ► Antirheumatic.

Feijoa sellowiana Berg.

Synonym ► *Acca sellowiana* Berg.

Family ► *Myrtaceae.*

Habitat ► Indigenous to western Paraguay, southern Brazil, Uruguay and parts of Argentina; cultivated in South India in Nilgiris and Kodaikanal hills.

English ► Feijoa, Pineapple Guava, New Zealand Banana.

Action ► The fruit contains iodine and vitamin C. Iodine content varies according to locality and fluctuates from year to year, usual range is 1.64–3.9 mg/kg Fruit also contains vitamin P-active polyphenols. The fruit is found beneficial only in mild cases of thyrotoxicosis.

Feronia limonia (Linn.) Swingle.

Synonym ► *F. elephantum* Corr.

Family ► *Rutaceae.*

Habitat ► Indigenous to South India; cultivated throughout the plains of India up to 500 m in the western Himalaya.

English ► Wood Apple.

Ayurvedic ► Kapittha, Dadhittha, Dadhiphala, Surabhichhada, Dantshatha, Kapipriya.

Unani ► Kuvet.

Siddha/Tamil ► Vilamaram, Vilangai, Narivila.

Folk ► Kaith.

Action ► Fruit—antiscorbutic, carminative, stimulates the digestive system bark. Pulp is included in a paste to tone the breast. Leaves—astringent; used for indigestion, flatulence, diarrhoea, dysentery and haemorrhoids.

Unripe fruit—prescribed in sprue, malabsorption syndrome. (*The Ayurvedic Pharmacopoeia of India.*)

The leaves and stem bark contain the coumarins, luvangetin, xanthotoxin and limonin and the steroids, sitosterol and sitosterol-O-beta-D-glucoside.

Antifungal compounds, psoralene from stem bark; xanthotoxin and osthenol from root bark and 2,6-dimethoxybenzo-quinone from the fruit shell are reported. Roots contain xanthotoxin and bergapten, used for the treatment of leucoderma, characterized by vitiligo.

Dosage ► Dried pulp of mature fruit—1–3 g powder. (*API* Vol. II.)

Ferula foetida Regel.

Synonym ► *F. assafoetida* Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Iran, Afghanistan and Pakistan. *F. narthex* occurs in Kashmir.

English ► Asafoetida.

Ayurvedic ► Hingu, Hinguka, Raamattha, Baahlika, Jatuka, Sahasravedhi, Vedhi.

Unani ► Hilteet, Hing.

Siddha/Tamil ► Perunkaayam.

Action ► Olea-gum-resin—stimulates the intestinal and respiratory

tracts and the nervous system bark. Used for simple digestive problems such as bloating, indigestion, constipation; for congested mucus, bronchitis, whooping cough, also for neurological affections, epilepsy, cramps and convulsions.

F

Key application ▶ In dyspepsia, chronic, gastritis, irritable colon; as spasmolytic. (*The British Herbal Pharmocopoeia*.) Contraindicated in bleeding disorders, pregnancy, infectious or inflammatory G1 diseases. (Sharon M. Herr.)

Ferula foetida contains: resins about 40–60%, consisting of asaresionotannols and their esters; farnesiferols, ferulic acid and other acids; about 25% gum; about 6–17% volatile oil, major constituent being sec-propenyl-isobutyl disulphide; sulphated terpenes, pinene, cadinene and vanillin; sesquiterpenoid coumarins. Some compounds from *Ferula* sp. ehibit antifertility activity.

Dosage ▶ Detoxified oleo-gum-resin—125–500 mg. (*API* Vol. I.)

Ferula galbaniflua Boiss. ex Buhse.

Synonym ▶ *F. gummosa* Boiss.

Family ▶ *Umbelliferae; Apiaceae.*

Habitat ▶ Native to Persia. Occasionally grown North-Western Himalaya.

English ▶ Galbanum.

Unani ▶ Gaosheer, Jawaasheer. (Galbanum has been wrongly equated with Gandhbirozaa, the oleo-resin of Pine.)

Action ▶ Oleo-gum-resin—digestive stimulant, antispasmodic; used for flatulence and colic; as an expectorant; and as a uterine tonic.

Ferula gummosa contains resinuous substances (60%), major constituents being galbaresenic and galbanic acids; volatile oil (5–30%) containing mono- and sesquiterpenes, alcohols and acetates; azulenes; thiol esters; undecatriens; resinic acids (30–40%); gums; umbelliferone.

Ferula jaeschkeana Vatke.

Family ▶ *Umbelliferae; Apiaceae.*

Habitat ▶ Jammu and Kashmir and Himachal Pradesh from 2,000 to 4,000 m.

Ayurvedic ▶ Hingupatri.

Action ▶ Abortifacient, anti-implantation. Being investigated as a potential contraceptive. A related species, *F. silphion*, was used in ancient Rome as a contraceptive.

The oil extracted from the leaves possesses mycotoxic property against dermatophytes, *Trichophyton* sp.

The ethanolic extract of the aerial parts produced dilation and congestion and hypertrophy in liver in rats.

The roots contain sesquiterpenoids. A coumarin, ferujol, isolated from the rhizome, showed abortifacient and anti-implantation activity at a single

dose of 0.6 mg/kg in rats by oral administration in a suspension of gum acacia. The essential oil shows antimycotic activity.

Ferula narthex Boiss.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Kashmir.

English ► Narthex asafoetida.

Ayurvedic ► Hingu (var.).

Unani ► Hilteet, Hing.

Siddha/Tamil ► Perungayam.

Action ► The gum-resin is used as asafoetida.

The oil is reported to be bacteriocidal. It exhibited antimicrobial activity against Gram-positive and Gram-negative bacteria.

The essential oil, obtained from seeds, shows antioxidant activity comparable to BHT.

The plant gave coumarin derivatives including umbelliferone and scopoletin.

Dosage ► Gum-resin—125–500 mg. (*CCRAS.*)

Ferula persica Willd.

Family ► *Umbeliferae; Apiaceae.*

Habitat ► Native to Arabia and Persia.

English ► Sagapenum.

Unani ► Sakbeenaj, Sakbekh.

Action ► Resin—less strong than asafoetida; used in the same way as asafoetida and galbanum. Used in Middle East for rheumatic affections and backache.

Ferula sumbul Hook. f.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Central Asia.

English ► Musk Root.

Folk ► Sumbul, Sambala.

Action ► Used as a sedative in hysteria and other nervous disorders. Also used as a mild gastro-intestinal stimulant. Formerly used for asthma, bronchitis and amenorrhoea.

Ferula sumbul contains 0.2–0.4% volatile oil; 5–15% resin; hydroxycoumarins including umbelliferone; sumbulic and angelic acids.

Ficus altissima Blume.

Family ► *Moraceae.*

Habitat ► Assam, eastwards to Malaysia.

Ayurvedic ► Nandi vrksha (var), Choraka-patra (var.).

Folk ► Gadgubar (Assam).

Action ► Leaves and bark—used in skin diseases. The tree is one of the recorded hosts of the Indian lac insect.

Ficus arnottiana Miq.

Family ► *Moraceae.*

Habitat ▶ Cultivated in Rajsthan, Madhya Pradesh, Bihar and Western Peninsula.

Ayurvedic ▶ Nandi Vriksha, Prarohi, Gajapaadapa, Paarasa Pipala.

Siddha/Tamil ▶ Kagoti.

Action ▶ Leaves—a moderate sterilizer, given to women after menses. Leaves and bark—used in skin diseases.

Dosage ▶ Bark—50–100 ml decoction. (*CCRAS*.)

Ficus asperrima Roxb.

Family ▶ *Moraceae.*

Habitat ▶ Madhya Pradesh and Western Peninsula.

Ayurvedic ▶ Kharapatra (non-classical).

Siddha/Tamil ▶ Kal-arasu.

Folk ▶ Kaala-umar.

Action ▶ Juice of bark—given for enlargement of liver and spleen.

Ficus benghalensis Linn.

Family ▶ *Moraceae.*

Habitat ▶ Sub-Himalayan tract and Peninsular India. Planted along roadsides, and in gardens.

English ▶ Banyan tree.

Ayurvedic ▶ Vata, Nyagrodha, Bahupaada, Dhruv.

Unani ▶ Bargad, Darakht-e-Reesh.

Siddha/Tamil ▶ Aalamaram.

Action ▶ Infusion of bark—used in diabetes, dysentery, and in seminal weakness, leucorrhoea, menorrhagia, nervous disorders, erysipelas, burning sensation. Milky juice and seeds—applied topically to sores, ulcers, cracked soles of the feet, rheumatic inflammations. Buds—a decoction in milk is given in haemorrhages. Aerial roots—antiemetic, topically applied to pimples. Leaves—a paste is applied externally to abscesses and wounds for promoting suppuration.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* recommends the aerial root in lipid disorders.

Phytosterolin, isolated from the roots, given orally to fasting rabbits at a dose of 25 mg/kg, produced maximum fall in blood sugar level equivalent to 81% of the tolbutamide standard after 4 h. The root bark showed antidiabetic activity in pituitary diabetes and alloxan-induced diabetes.

The alcoholic extract of the stem bark also exhibited antidiabetic activity on alloxan-induced diabetes in albino rats, and brought down the level of serum cholesterol and blood urea. This activity is attributed to a glucoside, bengalenoside and the flavonoid glycosides, leucocyanidin and leucopelargonidin. Bengalenoside is half as potent as tolbutamide. The leucopelargonidin glycoside is practically nontoxic and may be useful in controlling diabetes with hyperlipidemia. The leucocyanidin, when combined with a low dose of insulin, not only equalled in response the effects

brought about by a double dose of insulin, but also excelled in amelioration of serum cholesterol and triglycerides.

(Additional references: *Indian J Physiol Pharmacol*, 1975, 19(4), 218–220; *J Ethnopharmacol*, 1989, 26(1), 1–55; *Indian J Physiol Pharmacol*, 1994, 38(3), 220–222.)

Ficus benjamina Linn.

Family ► *Moraceae.*

Habitat ► The Eastern Himalaya, Assam, Bihar, Andhra Pradesh, kerala and the Andaman Islands.

English ► Java Fig.

Siddha ► Malai Ichi, Pon Ichi, Putrajuvi (Tamil).

Folk ► Pimpri (Maharashtra).

Action ► Diuretic. Leaves—decoction, mixed with oil, is applied to ulcers.

The fruits gave bergapten. The latex, in addition to bergapten, gave alpha-amyrin and imperatorin.

Ficus carica Linn.

Family ► *Moraceae.*

Habitat ► Native to the Mediterranean region; now cultivated in Uttar Pradesh, Rajasthan, Punjab, Andhra Pradesh and Maharashtra.

English ► Common Fig.

Ayurvedic ► Phalgu, Manjul, Raajodumbara, Bhadrodumbara.

Unani ► Anjeer, Teen.

Siddha/Tamil ► Semaiatti.

Action ► Fruit—gentle laxative and expectorant. Syrup of figs—a remedy for mild constipation. Fruit pulp-analgesic and anti-inflammatory, used for treating tumours, swellings and gum abscesses. Latex—analgesic and toxic. Used for treating warts, insect bites and stings. Leaf—used in lucoderma. Bark—used for eczema and other skin diseases.

Key application ► As a laxative. (Included among unapproved herbs by *German Commission E.*)

The leaves gave bergapten, psoralen, taraxasterol, beta-sitosterol, rutin and a sapogenin. Calotropenyl acetate, lepeol acetate and oleanolic acid have been identified in the leaves.

Three peptides which exhibit action against angiotensin I-converting enzyme (ACE) have been isolated from the fresh latex. Their inhibitory activity is similar to that of ACE inhibitors derived from casein. (ACE catalyzes both the production of vasoconstrictor angiotensin II and the inactivation of the vasodilator bradykinin.)

Dosage ► Fruit—10–20 ml juice; 5–10 g paste. (*CCRAS.*)

Ficus cordifolia Roxb.

Synonym ► *F. rumphii* Bl.

Family ► *Moraceae.*

Habitat ► Throughout India, up to 1,700 m in the hills.

Ayurvedic ► Ashmantaka (var.)

Folk ► Gajanaa, Ashtaa, Paakar.

Action ► Fruit juice and latex—antiasthmatic and vermifuge.

Ficus cunia Buch.-Ham.

Synonym ► *F. semicordata* Buch.-Ham. ex Sm.
F. conglomerata Roxb.

Family ► *Moraceae.*

Habitat ► Sub-Himalayan tract from Chenab eastward to Bhutan and in Assam, Bengal and Orissa.

English ► Indian Fig.

Ayurvedic ► Malayu, Choraka-patra, Laakshaa-vrksha, Laghu-udumbara.

Siddha ► Taragadu (Tamil).

Action ► See *F. carica.* Fruits—spasmolytic; used in aphthous complaints. Root—used for bladder and visceral troubles. Bark-decoction—used for washing ulcers; juice and powdered bark—applied to wounds and bruises. Syconium—used for ulcers of mucous membrane. Syconium and bark—antileprotic.

The tree is one of the recorded hosts of the Indian lac insect.

Ficus dalhousiae Miq.

Family ► *Moraceae.*

Habitat ► Tamil Nadu.

Ayurvedic ► Soma-valka (doubtful synonym).

Siddha/Tamil ► Kal Aal, Pei Aal.

Action ► Fruit—cardiotonic. Leaves and bark—used in affections of the liver and skin diseases.

Ficus heterophylla Linn. f.

Family ► *Moraceae.*

Habitat ► Throughout the warmer parts of India.

Ayurvedic ► Traayanti, Traaya-maanaa.

Siddha/Tamil ► Kodi Athi.

Folk ► Daantiraa (Rajasthan).

Action ► Fruits—used for constipation during fevers. Leaf-juice—antidysenteric. Root bark—mixed with water, given internally in coryza, asthma and bronchial diseases. Root—antispasmodic.

Ficus hispida Linn. f.

Synonym ► *F. daemona* Koen. ex Vahl.
F. oppositifolia Roxb.

Family ► *Moraceae.*

Habitat ► Outer Himalaya from Chenab eastwards to West Bengal Assam, Central and South India and the Andaman Islands.

Ayurvedic ► Kaakodumbara, Kaashtodumbara, Phalgu, Malayu, Malapu.

Unani ► Anjir Dashti.

Siddha/Tamil ► Peyatti, Chona Atthi.

Action ► Syconium—galactagogue. Bark and seed—purgative, emetic.

The Ayurvedic Pharmacopoeia of India recommends the fruit in jaundice, oedema and anaemia; fruit and root in leucoderma, vitiligo.

The fruits, seeds and bark contain beta-sitosterol, beta-amyrin, *n*-triacontanyl acetate, gluacol acetate, hispidin, a phenanthraindolizidine alkaloid, bergapten and psoralen. A leucocyanin has been isolated from the root; oleanolic acid from the leaves.

Dosage ► Fruit—10–20 g; root—1–3 g powder. (*API* Vol. III.)

Ficus lacor Buch.-Ham.

Synonym ► *F. infectoria* auct. non-Willd.
F. viren Aiton.

Family ► *Moraceae.*

Habitat ► Plains and lower hills of India.

English ► White Fig.

Ayurvedic ► Plaksha, Karpari, Pitana, Parkati.

Siddha/Tamil ► Kurugu, Itthi, Kallalnaram.

Action ► Bark—decoction is used for washing ulcers, as a gargle in salivation; also used for menstrual disorders and leucorrhoea. Leaf—estrogenic. Plant— used in erysipelas, ulcer, epistaxis.

Fresh ripe fruit or powder of dried fruits is used to treat diabetes.

The Ayurvedic Pharmacopoeia of India indicates the use of the fruit and stem bark in syncope, delirium and illusive and unstable state of mind.

The stem bark of the plant yield acetates of long-chain alcohols, methyl-ricinolate, beta-sitosterol, lanosterol, caffeic acid, bergenin and sugars. The triterpenoids, lupeol and alpha- and beta-amyrin, are also present in the leaves. Flavonoids including sorbifolin and scutellarein derivatives, have been isolated from the leaves.

Dosage ► Stem bark—50 g powder for decoction (*API* Vol. II); dried fruit—5–10 g. (*API* Vol. IV.) Leaf, root—10–20 g paste. (*CCRAS.*)

Ficus microcarpa Linn. f.

Synonym ► *F. retusa* auct. non Linn.

Family ► *Moraceae.*

Habitat ► West Bengal, Bihar, Central and Peninsular India and Andaman Islands. Grown in gardens, and as an avenue tree. Quite common in New Delhi.

Ayurvedic ► Plaksha (related sp.).

Siddha/Tamil ► Kal Ichi.

Folk ► Itti.

Action ► Bark—antibilious. Leaf—antispasmodic. Root bark and leaf—used in preparations of oils and ointments for ulcers, skin diseases, oedema and inflammations.

Ficus palmata Forsk.

Synonym ► *F. caricoides* Roxb.
F. virgata Wall. ex Roxb.

Family ► *Moraceae.*

Habitat ► North-western India and Rajasthan, from Kashmir eastward to Nepal, ascending to 1,000 m.

English ► Indian Fig.

Ayurvedic ► Phalgu, Anjiri.

Siddha ► Manjimedi (Telugu).

Action ► Fruit—demulcent and laxative. Latex is applied on pimples. Ripe fruits—hypotensive.

Leaves gave bergapten and beta-sitosterol.

Ficus racemosa Linn.

Synonym ► *F. glomerata* Roxb.

Family ► *Moraceae.*

Habitat ► Throughout India. Grows wild in forests and hills. Often found around subterranean water streams.

English ► Cluster Fig, Country Fig.

Ayurvedic ► Udumbara, Sadaaphala, Hema-daudhaka, Jantuphala, Yagyaanga.

Unani ► Anjir-e-Aadam, Anjir-e-Ahmak, Gular.

Siddha/Tamil ► Atthi.

Action ► Astringent and antiseptic; used in threatened abortions, menorrhagia, leucorrhoea, urinary disorders, skin diseases, swellings, boils, haemorrhages. Unripe fruits—astringent, carminative, digestive, stomachic; used in diarrhoea, dyspepsia, dysentery, menorrhagia and haemorrhages. Ripe fruits—antiemetic, also used in haemoptysis. Root and fruit—hypoglycaemic. Bark—decoction is used in skin diseases, inflammations, boils and ulcers.

The Ayurvedic Pharmacopoeia of India recommends the use of the bark in lipid disorders and obesity.

Leaves and fruit contain gluacol. The fruit also contains beta-sitosterol, lupeol acetate, friedelin, higher hydrocarbons and other phytosterols.

Petroleum ether extract of the stem bark significantly reduced blood sugar level of rats with streptozotocin-induced diabetes. It completely inhibited glucose-6-phosphate dehydrogenase from rat liver. Extracts of fruit and latex did not show any significant effect on blood sugar level of diabetic rats, they inhibited only glucose-6-phosphate but not arginase from rat liver.

An alcoholic extract of the bark has been found to be very effective in reducing blood sugar in alloxan-induced diabetic albino rats. It helped in improving the damaged beta cells of islets of Langerhans, thus exerting permanent blood sugar lowering effect.

The ethanolic extract of seeds also showed hypoglycaemic activity.

Lignin, the main fiber constituent of the fruit, prevented the rise in serum cholesterol levels of some extent. Fresh whole fruits, used as a source of dietary fibre, exhibited more hypocholesterolemic activity than pure cellulose.

Dosage ► Bark—20–30 g for decoction. (*API* Vol. I.)

Ficus religiosa Linn.

Family ► *Moraceae.*

Habitat ► Sub-Himalayan tracts, West Bengal, Central and South India; planted throughout India as an avenue tree.

English ► Peepal, Bot-tree.

Ayurvedic ► Ashvattha, Bodhidru, Bodhivrkisha, Sebya, Chalapatra, Gajabhaksha, Kshiradruma, Peeppal.

Unani ► Peepal.

Siddha/Tamil ► Arasu, Ashvatham.

Action ► Bark—astringent, antiseptic, alterative, laxative, haemostatic, vaginal disinfectant (used in diabetes, diarrhoea, leucorrhoea, menorrhagia, nervous disorders; also in skin diseases.) Applied externally on unhealthy ulcers and wounds. Leaves and twigs—laxative.

The bark contains beta-sitosteryl-D-glucoside. Vitamin K, *n*-octacosanol, methyl oleanolate, lanosterol, stigmasterol, lupen-3-one are reported from the stem bark.

A hypoglycaemic response is reported for beta-sitosterol-D-glucoside obtained from the bark.

Aerial roots are given to women, also used in prescriptions, for inducing conception. The dried fruits are used as a uterine tonic.

The fruits contain 4.9% protein having the essential amino acids, isoleucine and phenylalanine. The chloroform extract of fruits exhibited antitumour and antibacterial activities in bioassays.

Various plant parts are included in formulations used for menorrhagia, metrorrhagia, blood dysentery, bleeding piles, haematuria and haemorrhages.

Dosage ► Bark, fruit—50–100 ml decoction. (*CCRAS.*)

Ficus talbotii G. King.

Family ► *Moraceae.*

Habitat ► Peninsular India.

Ayurvedic ► Plaksha (related species).

Siddha/Tamil ► Itthi, Kal Itthi.

Action ► Bark—antileprotic (used for ulcers and venereal diseases). Aerial parts exhibit diuretic, spasmolytic, CNS depressant and hypothermic activity.

Fimbristylis ovata Kern.

Synonym ► *F. monostachya* Hassk.

Family ► *Cyperaceae.*

Habitat ► Throughout warmer regions of India, as a weed.

Ayurvedic ► Ibha-muulaka. (Also equated with *F. annua.*)

Action ► Used in adenitis, scrofula, syphilis; also in cough, bronchitis and asthma.

Flacourita indica (Burm. f.) Merr.

Synonym ► *F. ramontchi* L'Herit.

Family ► *Flacourtiaceae.*

Habitat ► Cultivated in Assam, Maharashtra and Bengal.

English ► Ramontchi, Madagascar Plum, Mauritius Plum, Governor's Plum.

Ayurvedic ► Vikankata, Yajnya-vrksha, Gopakantaa, Sruva-vrksha.

Siddha/Tamil ► Sottai-kala, Katukala.

Folk ► Poniol (Assam), Kataaya, Kakaiyaa.

Action ► Gum—anticholerin. Used as a gargle. Applied to eczema and skin diseases. Bark—antidysenteric, astringent, diuretic. Seed—antirheumatic. Fruit—stomachic. Root—applied externally in skin diseases. Leaves and young shoots—astringent and stomachic.

The Ayurvedic Pharmacopoeia of India recommends the use of the leaf and stem bark in jaundice, oedema and diseases due to vitiated blood.

The bark contains a phenolic glucoside ester, (−)-flacourtin. The heartwood contains the steroid, ramontoside, beta-sitosterol and its beta-D-glucopyranoside.

The fruits contain 3.9–7.2% protein, vitamin C and mineral matter 0.39%; calcium 24.1 and phosphorus 12.5 mg/100 g. Fruits are given in jaundice and enlarged spleen.

Dosage ► Leaf—50–100 g for decoction. (*API* Vol. IV.) (Also bark—*CCRAS.*)

Flacourtia jangomas (Lour.) Raeusch.

Synonym ► *F. cataphracta* Roxb.

Family ► *Flacourtiaceae.*

Habitat ► Bengal, Assam, Orissa, Andhra Pradesh and Eastern Ghats.

English ► Puneala Plum.

Ayurvedic ► Praachinaamalaka, Paaniyaamalaka. (Taalispatri (Hindi), Taalispatra (Gujarati), Taalisam (Malyalaam), Taalispatramu (Telugu) are confusing synonyms of Paaniyaamalaka.)

Unani ► Taalisfar, Nabaq Hindi, Zarnab. In *National Formulary of Unani Medicine*, Zarnab, synonym Telispattar, is equated with *F. catapracta*, also with *Cinnamonum tamala Nees.* (Zarnab is also equated with *Salix aegyptiaca* Sprengel and Taalisfar with *Rhododendron anthapogon D. Don* or *R. lipidotum* by Unani scholars.)

Siddha/Tamil ► Saralu, Vayangarai.

Folk ► Paniyaalaa (Bihar).

Action ► Leaves—astringent, antidiarrhoeal, stomachic. Used in chronic bronchitis. Fruit—used in affections of the liver. Bark and fruit—antibilious. Infusion of bark is used as a gargle. Fruits contain (dry basis) protein 3.9%; vitamin C 218, Ca 175, K 158, P 147, Fe 118, Mg 57 mg/100 g. The fruit stem bark and bark yielded a coumarin, ostruthin, and limonoids, jangomolide and limonin.

(Taalisha, Taalisam, Taalisapatri, Taalisapatra—all the synonyms are now equated with Abies spectabilis (D. Don) Spach., *synonym A. webbiana* Lindl., *Pinus webbiana* Wall.)

Flacourtia sepiaria Roxb.

Family ► *Flacourtiaceae.*

Habitat ► Kumaon and n the dry forests of Bengal, Bihar, Orissa and South India.

Ayurvedic ► Vikankata (related species), Kinkini (provisional classical synonym).

Folk ► Kondai, Kondari.

Action ► The bark of the plant, triturated in sesame oil, is used as liniment in gout and rheumatism.

Foeniculum vulgare Mill.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to the Mediterranean region; now cultivated mainly in Punjab, Assam, Maharashtra and Vadodara (Gujarat).

English ► Fennel. (Poison hemlock has been misidentified as fennel.)

Ayurvedic ► Mishreyaa, Mishi, Madhurikaa, Madhuraa, Shatapushpaa, Shataahvaa. (Shatpushpaa is equated with Saunf and Shataahvaa with Soyaa. Some authors treat these as vice-versa.)

Unani ► Baadiyaan, Saunf.

Siddha/Tamil ► Sombu.

Action ► Carminative, stomachic, antispasmodic, emmenagogue, galactagogue, anti-inflammatory, diuretic. Relieves bloating, nausea, settles stomach and stimulates appetite. Also used in amenorrhoea and enuresis.

Key application ► In dyspepsias such as mild, spastic, gastrointestinal afflictions, fullness, flatulence. Fennel syrup or honey can be used for the catarrh of the upper respiratory tract in children. Fennel oil preparations not recommended during pregnancy. (*German Commission E, ESCOP, WHO.*)

German Commission E reported that fennel seed promotes gastrointestinal motility and in higher concentrations acts as antispasmodic. In experiments anethole and fenchone have been shown to have a secretolytic action in respiratory tract. *The British Herbal Pharmacopoeia* and *Indian Herbal Pharmacopoeia* report its carminative and spasmolytic property.

Fennel seed contain about 8% volatile oil (about 50–60% anethole, among others 10–15% fenchone and methylchavicol), flavonoids, coumarins (including bergapten) and sterols.

The extract of seeds inhibits the growth of micro-organism, especially *Streptococcus mutans*, that are responsible for dental caries and periodontal diseases.

The essential oil from the seed is reported to be antibacterial, antifungal, antioxidant, emmenagogue, oxytocic and abortifacient.

The fatty acid, petroselenic acid, obtained from the oil, exhibited antimicrobial activity.

Anethole, a major constituent of fennel seed/oil has been found to be an active estrogenic agent with minimal hepatotoxicity and no teratogenic effect.

The oil also exhibits anticarcinogenic activity and can be used as a chemoprotective agent.

It possesses antioxidant activity close to BHT.

Anethole and limonene are used in pharmaceutical compositions for decreasing the side effects of chemotherapy and increasing the immune function.

Limonene showed the capacity to inhibit mammary tumours in rats.

The boiling water extract of leaves shows hypotensive effect in rats.

The methanolic extract of seed showed antispasmodic activity, while aqueous extract accelerated the spontaneous movement of rabbit stomach.

Dosage ► Dried fruit—3–6 g powder. (*API* Vol. I.)

Fraxinus griffithii Clarke.

Family ► *Oleaceae.*

Habitat ► Arunachal Pradesh (Mishmi Hills).

Action ► Toxic to CNS.

The extract of the bark and leaves are used as an adulterant of illegal opium and are sold in the black market in certain areas in Indonesia.

The bark contains an iridoid glucoside, ligstroside, and the phenolic glucosides, syringin and sinapaldehyde glucoside.

Fraxinus hookery Wenz.

Synonym ► *F. excelsior* auct. non L.

Family ► *Oleaceae.*

Habitat ► *F. excelsior* Linn.—Great Britain, Europe and North America. *F. hookery*—Western Himalaya at 2,700–3,350 m.

English ► European Ash, Weeping Ash.

Folk ► Kum, Sum, Hum, Sinnun (Punjab, Kashmir).

Action ► *F. excelsior*—laxative, anti-inflammatory, febrifuge. The bark and leaves are used for arthritis and rheumatism.

The herb gave coumarin derivatives, including fraxin, fraxetin and fraxinol; flavonoids based on aesculetin, including aescin, also rutin and quercetin. A coumarin derivative is actively diuretic.

A saccharine exudate, manna, consisting principally of mannitol, is obtained by incising the stem barks of some *Fraxinus* sp. found in India. The manna of commerce is derived from *F. ornus. F. hookery* (bark)—astringent, febrifuge, bitter tonic. Leaves—cathartic.

Ash Bark is used, in decoction, in the treatment of intermittent fever and ague, as a substitute for Peruvian bark. Also used for treating obstructions of the liver and spleen and in rheumatism and arthritic affections.

Preparations of European Ash Bark showed an analgesic, anti-exudative and antiphlogistic action. (*German Commission E.*)

Fraxinus ornus Linn.

Family ► *Oleaceae.*

Habitat ► Indigenous to the coasts of the Mediterranean from Spain to Smyrna.

English ► Flake Manna.

Unani ► Turanjeen.

Action ► A children's laxative. Usually prescribed with other purgatives. (Not to be used in the presence of ileus.)

Key application ► In constipation where an easier elimination and a soft stool are desirable; in animents such as anal fissures, haemorrhoids and post-rectal and surgery. (*German Commission E.*)

The exudation contains 40–90% mannitol, 10–15% stachyose and mannotriose, glucose, fructose.

Fritillaria cirrhosa D. Don.

Family ► *Liliaceae.*

Habitat ► Central and Western Himalaya between 3,700 and 5,350 m.

Folk ► Yathu.

Action ► Corm—antiasthmatic, used for bronchitis and tuberculosis.

Fritillaria imperialis L.

Family ► *Liliaceae.*

Habitat ► Kashmir at 1,700–3,000 m.

English ► Crown Imperial, Imperial Fritillary.

Action ► Bulbs—emollient, diuretic, resolvent, spasmolytic, hypotensive, cardiotonic.

The bulbs contain steroidal alkaloids—ebeinone, eduardine, edpetilidine, verticinone, isoverticine and isobaimonidine and pimaradienic diterpene, oblongifolic acid.

Ebeinone exhibited anticholinergic activity.

Fritillaria roylei Hook.

Family ► *Liliaceae.*

Habitat ► Western temperate Himalaya from Kashmir to Kumaon at 2,700–4,35 m.

Ayurvedic ► Kshira-Kaakoli, Viraa, Kaayasthikaa, Vaaysoli.

Action ► Used in the treatment of asthma, bronchitis and tuberculosis. (*Withania somnifera* is a substitute for Kaakoli and Kshira-Kaakoli.)

The bulbs gave alkaloids—peimine, peimisine, peimiphine, perminine, permidine and permitidine. The bulbs also gave neutral compounds—propeimin and a sterol. The plant gave kashmirine.

Dosage ► Bulb—3–6 g powder. (*CCRAS.*)

Fucus vesiculosus Linn.

Family ► *Fucaceae.* (*Laminaria* sp.)

Habitat ► On the shores of the United Kingdom, North Atlantic Ocean, North Pacific Coast of America; as a weed; found in Indian Ocean on the Manora Rocks. Allied species—*F. distichus* Linn., and *F.*

nodosus Linn. (Included in *Glossary of Indian Medicinal Plants*, CSIR, also in its second supplement.) *F. nodosus* is found in India along sea shores.

English ► Bladderwrack, Black Tang, Rockweed, Kelp.

F

Action ► Weed—one of the richest source of minerals, chiefly iodine, sodium, manganese, sulphur, silicon, zinc and copper. Effective against obesity, antirheumatic. Stimulates circulation of lymph. Endocrine gland stimulant. Allays onset of arteriosclerosis by maintaining elasticity of walls of blood vessels. Mild diuretic, bulk, laxative, antibiotic. High sodium content may reduce effectiveness of diuretics.

(The herb contains trace metal, particularly iodine from 0.03–1.0%. It may contain waste metals such as cadmium and strontium, when grown in a polluted environment. Variable iodine content and arsenic contamination make the herb unsafe.)

The herb should be used with caution in hyperthyroidism and hypothyroidism. Excess thyroid activity may be aggravated by the iodine content of the herb; it may disrupt thyroid function. One gram of Bladderwrack might contain as much as 600 mcg iodine (Ingesting more than 150 mcg iodine per day may cause hyperthyroidism or exacerbate existing hyperthyroidism.) (*Natural Medicines Comprehensive Database,* 2007.)

Due to the antithrombin effects of its fucan polysaccharides, consumption of the herb in cases of G1 bleeding disorders is contraindicated.

(Included among unapproved herbs by *German Commission E.*)

Fumaria officinalis Linn.

Family ► *Fumariaceae.*

Habitat ► Native to Europe and North America. Found at high altitudes in Nilgiris and Salem (Tamil Nadu).

English ► Fumitory.

Ayurvedic ► Parpata (related species).

Unani ► Shaahtaraa.

Action ► Antispasmodic and amphicholeretic. Stimulant to liver and gall bladder; used for eczema and other skin diseases. Also diuretic and mild laxative.

Key application ► In spastic discomforts in the area of gallbladder and bile ducts, as well as the gastrointestinal tract. (*German Commission E, The British Herbal Pharmacopoeia.*)

The herb contains indenobenzazepine alkaloids—fumaritrin and fumarofine.

Other alkaloids include (−)-scoulerine, protopine, fumaricine, (+)-fumariline. The plant also contain rutin, fumaric acid and hydroxycinnamic acid derivatives.

Protopine exhibits antihistaminic, hypotensive, bradycardic and sedative activity in small doses, but excitation and convulsions in large doses. (*Natural Medicines Comprehensive Database,* 2007.)

The seed oil contains myristic 4.2, palmitic 17.6, stearic 2.7, oleic 19.6, linoleic 55.7 and linolenic acid 0.2%.

The upper flowering part of the herb is used for biliary disorders, various skin diseases and fevers. The herb can also treat arteriosclerosis by helping in lowering blood cholesterol level and improving the elasticity of arterial wall.

Fumaria parviflora Lam.

Synonym ► *F. indica* (Haussk.) Pugsley.

Family ► *Fumariaceae.*

Habitat ► At high altitudes in Tamil Nadu; up to 2,700 m on the Himalayas.

English ► *Fumitory.*

Ayurvedic ► Parpata, Parpataka, Varatikta, Renu, Kavacha, Sukshmapatra.

Unani ► Shaahtaraa.

Siddha/Tamil ► Thura.

Folk ► Pittapaaparaa.

Action ► Detoxifying, laxative, diuretic, diaphoretic.

The plant contains isoquinoline alkaloids—including protopine, sanguinarine, cryptopine, *d*-bicuculline, fumaridine, fumaramine. The leaves contain kaempferol and quercetin glycosides.

Dosage ► Whole plant—1–3 g (*API* Vol. IV); 3–35 g powder; 50–100 ml decoction. (*CCRAS.*)

Fumaria vaillantii Loisel.

Family ► *Fumariaceae.*

Habitat ► Throughout India on the hills.

Ayurvedic ► Parpata.

Unani ► Shaahtaraa.

Folk ► Pittapaaparaa.

Action ► The plant is used as a substitute for *Fumaria parviflora*.

A decoction of the herb is used for blood purification and in skin diseases, especially psoriasis.

Methanolic extract of the plant exhibits antimicrobial activity against *Sarcina subflava*.

The herb contains several isoquinoline alkaloids which are common to *Fumaria officinalis* and *Fumaria parviflora*.

Protopine showed smooth muscle relaxant activity in guinea-pigs, rabbits and albino rats and hydrocholeretic activity in anaesthetized dogs. L-tetrahydrocoptisine showed antipsychotic (neuroleptic) activity in albino rats and mice. Narceimine, narlumidine, adlumidine and protopine nitrate exhibit anti-inflammatory activity.

Alkaloids, narlumidine and protopine, exhibit significant antifungal activity.

G

Galium aparine Linn.

Family ► *Rubiaceae.*

Habitat ► The Temperate Himalayas.

English ► Goosegrass, Clivers, Cleavers, Catch Weed.

Action ► Choleretic, stomachic, diuretic, refrigerant, lymphatic, alterative, antiscorbutic, detoxifier; non-steroidal anti-inflammatory used for enlarged lymph nodes, especially cervical neck nodes, cystic and nodular changes in the glands, modular goitre. Used as a cleansing drink for malignant conditions and skin disorders, including psoriasis.

Key application ► As diuretic. (*The British Herbal Pharmacopoeia.*)

The plant contains iridoid monoterpenes (asperuloside), benzyl isoquinoline alkaloids (including protopine), beta-carbolin alkaloids (including harmine), quinazoline alkaloids and flavonoids (such as luteolin). Methanolic extract of the plant contains chlorogenic acid, scopoletin and rutin. The plant is reported to contain several sterols. The root contains anthraquinones.

Asperuloside can be chemically converted to prostanoid intermediates.

Galium verum Linn.

Family ► *Rubiaceae.*

Habitat ► Kashmir, Lahul and other west Himalayan regions, at altitude of 2,000–3,000 m

English ► Lady's Bedstraw, Cheese Rennet.

Action ► Herb—diuretic, used for kidney stone, gravel, gout. Used topically for poorly healing wounds.

The plant contains the iridoids including asperuloside and galioside; flavonoid glycosides; quercetin-3-glucoside, quercetin-7-glucoside, quercetin-3-rutinoside, luteolin-7-glucoside; anthraquinone derivatives, including alizarin, and large amounts of salicylic acid. Its high organic acid content causes curdling of milk.

The root contain *n*-alkanes.

Garcinia cambogia Desr.

Synonym ► *G. gummi-gutta* (Linn.) Robs.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Western Ghats and Nilgiris.

English ► Gamboge tree.

Ayurvedic ► Vrkshaamla (allied species), Kokam (var.).

Siddha/Tamil ► Kodakkapuli.

Action ► Fruit rind—used in rickets and enlargement of spleen, in skeletal fractures.

The plant contains iso-prenylated polyphenols—cambogin and cambo-

ginol. The fruit contains about 30% acid (dry weight basis), which is essentially (−)-hydroxycitric acid (HCA). HCA is a potent inhibitor of ATP citrate lyase, the enzyme that produces acetyl CoA for both fatty acid and cholesterol synthesis.

Taking Garcinia fruit rind extract orally does not seem to help decrease weight, satiety, fat oxidation or energy expenditure in obese people. Some researchers are of the view that garcinia inhibits the supply of fatty acids without affecting adipose conversion. (*Natural Medicines Comprehensive Database*, 2007.)

Latex gave benzophenone derivatives, camboginol and cambogin.

G

Garcinia cowa Roxb.

Synonym ► *G. kydia* Roxb.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Tropical forests of Assam, Bengal, Orissa and the Andamans.

Ayurvedic ► Paaraavata, Kowaa.

Folk ► Kaphal (Nepal), Kujithekera (Assam).

Action ► Sun-dried slices of the fruit are used in dysentery. The latex is used as febrifuge. Gum-resin—drastic cathartic (may produce nausea and vomiting).

The fruits from Assam contain: total soluble solids 9.8, titrable acidity 4.7, total sugars 3.8% and vitamin C 8.64 mg/g

The latex gave xanthones, cowanin, cowanol, cowaxanthone and norcowanin.

The bark contains cowanin, cowanol, cowaxanthone and rubraxanthone.

Cawanol and cowaxanthone are reported to exhibit moderate antimicrobial activity against *Staphylococcus aureus*.

Garcinia hanburyi Hook. f.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Evergreen forests of Assam and Khasi Hills.

English ► Siam Gamboge.

Ayurvedic ► Kankushtha; Kaalakushtha, Tamaala.

Unani ► Usaar-e-revand.

Action ► Gum-resin—drastic hydragogue, cathartic; used for dropsical conditions. Toxic. The gum-resin contains 70–75% resins consisting mainly of alpha- and beta-garcinolic acids with gambogic acids; about 20–25% gum.

Gambogic acid, morellic acid and isomorellic acid are toxic constituents of the gum-resin.

Garcinia indica Choisy.

Synonym ► *G. purpurea* Roxb.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Evergreen forests of Western Ghats from Konkan southwards and in Goa. Also cultivated in southern districts of Maharashtra and on lower slopes of Nilgiris.

English ► Kokam Butter tree, Mangosteen Oil tree.

Ayurvedic ► Vrkshaamla, Tintidika, Chukra, Amlavrkshak, Kokam, Amsula.

Siddha/Tamil ► Murgal.

Folk ► Kokam.

Action ► Fruit—antiscorbutic, cholagogue, cooling, antibilious, emollient and demulcent. A syrup from the fruit juice is given in bilious affections. Bark—astringent, Oil or Kokam Butter—used for dysentery and diarrhoea with mucus. Applied externally to ulcerations, fissures of lips, chapped skin and skin diseases.

The fruit rind contain a polyisoprenylated phenolic pigment, garcinol and its isomer isogarcinol, along with (–)-hydroxycitric acid, cyanidin-3-glucoside and cyanidin-3-sambubioside. L-leucine and DNP-L-leucine hydrochloride have been reported from the leaves.

EtOH (50%) extract of aerial parts exhibited semen coagulant and CNS depressant activity.

Kokum butter contains fatty acids—palmtic 2.0, stearic 57.5, oleic 39.0, linoleic 1.3 and others 0.2%.

Dosage ► Fruit—10–20 ml juice; root bark—40–80 ml decoction. (*CCRAS.*)

Garcinia mangostana Linn.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Native to Malaysia. Now cultivated mainly on lower slopes of the Nilgiris.

English ► Mangosteen, Dodol.

Siddha/Tamil ► Sulambuli, Mangusta.

Folk ► Mangustaan.

Action ► Fruit—antileucorrhoeic, astringent, antifungal, antibacterial; used in cystitis, diseases of the genitourinary tract, diarrhoea, tropical dysentery and fevers. Pericarp—used externally for eczema and other skin diseases. Leaves—anti-inflammatory, anti-immunosuppressive, antiprotozoal, antimicrobial.

The plant contains anthocyanin glycosides, a benzophenone, maclurin and several prenylated and related xanthones. The leaves contain terpenoids, xanthones and long chain hydrocarbons.

The pericarp (fruit hull) contains the xanthone derivatives, mangostin, normangostin, beta-mangostin, gamma-mangostin, isomangostin as major constituents.

Mangostin, isolated from the rind of fruit, inhibited primary and secondary responses to adjuvant-induced arthritis in rats. Mangostin, isomangostin and mangostin triacetate exhibited pronounced anti-inflammatory activity in rats both by *i.p.* and oral routes.

Mangostin also produced antiulcer activity in rats.

Mangostin and some of its derivatives produced CNS depression, characterized by ptosis, sedation and decreased motor activity.

Gamma-mangostin showed more potent radical scavenging and antioxidant activity than BHA.

G

Garcinia morella (Gaertn) Desv.

Synonym ▶ *G. pictoria* Roxb.

Family ▶ *Guttiferae; Clusiaceae.*

Habitat ▶ Throughout southern India, also in Assam and West Bengal, up to 1,000 m

English ▶ Indian Gamboge.

Ayurvedic ▶ Kankushtha, Tamaal, Taapichha, Ushaare-revand.

Siddha/Tamil ▶ Iravakhinni.

Action ▶ Gum-resin—hydragogue, cathartic, anthelmintic. Used in dropy and amenorrhoea. Causes nausea, vomiting and griping in large doses.

The gum contains morellin, neomorellin, beta-guttiferin and alpha-guttiferin and their derivatives. The heartwood gave morelloflavone. Seed coat gave morellin, isomorellin and their neo derivatives which exhibited antibacterial and antiprotozoal activity.

Dosage ▶ Gum-resin—50–125 mg. (*CCRAS.*)

Garcinia pedunculata Roxb.

Family ▶ *Guttiferae; Clusiaceae.*

Habitat ▶ Forests of northeast Bengal, sporadic in NEFA, Manipur and upper Assam

Ayurvedic ▶ Amlavetasa. Vetasaamla.

Folk ▶ Thaikala (Bengal).

Action ▶ Antiscorbutic, astringent, cooling, cardiotonic, emollient. Used in anorexia, dyspepsia, colic, liver and spleen diseases difficult micturition. Cough and other respiratory disorders, ulcers and skin diseases.

Dry fruits (pericarp) contain the benzophenones, pedunculol, garcinol and cambogin.

The heartwood gave benzophenone and xanthone.

Dosage ▶ Fruit—5–10 ml juice. (*CCRAS.*)

Garcinia xanthochymus Hook. f. ex T. And.

Synonym ▶ *G. tinctoria* (DC.) W. F. Wt.

Family ▶ *Guttiferae; Clusiaceae.*

Habitat ▶ The lower hill forests of Eastern Himalayas, Peninsular India, Orissa, Maharashtra and the Andamans.

English ▶ Egg tree.

Ayurvedic ▶ Tamaal (var.), Vrkshaamla (var.).

Siddha/Tamil ▶ Kulavi, Malaippachai, Mukki, Tamalam

Folk ▶ Amsul (Maharashtra).

Action ▶ Fruit—anthelmintic, improves appetite. Also used as a cardiotonic. Fruit gave xanthochymol and isoxanthymol (polyprenylated benzophenone derivatives), flavones and xanthones.

Gardenia gummifera Linn. f.

Synonym ► *G. arborea* Roxb. *G. inermis* Dietr.

Family ► *Rubiaceae.*

Habitat ► Uttar Pradesh, Bihar, Andhra Pradesh, Maharashtra, Karnataka, Kerala and Tamil Nadu.

English ► Gummy Cape Jasmine.

Ayurvedic ► Venupatrikaa, Naadihingu, Hingushivaatikaa. Hingupatrikaa, Hingupatri (also equated with *Ferula Jaeschkeana* Vatke).

Unani ► Dikaamaali.

Siddha/Tamil ► Dikkamalli, Kambil, Sinna Kambil.

Action ► Gum—carminative, antispasmodic, stimulant, diaphoretic, anthelmintic, antiseptic, expectorant. Given to children in nervous disorders and diarrhoea due to dentition.

The gum yielded flavones, including gardenin, de-Me-tangeretin and nevadensin; wogonins, isoscutellarein, apigenin and de-MeO-sudachitin.

Dosage ► Gum—250–500 mg. (*CCRAS.*)

Gardenia jasminoides Ellis.

Synonym ► *G. florida* Linn. *G. augusta* Merrill.

Family ► *Rubiaceae.*

Habitat ► Native to China and Japan; cultivated in Indian gardens.

English ► Cape Jasmine.

Ayurvedic ► Gandharaaja.

Siddha/Tamil ► Karinga.

Action ► Plant—cathartic, antispasmodic, anthelmintic, antiperiodic. Root—antidysenteric. Also used in dyspepsia and nervous disorders. Fruits—used in gastric hyperacidity, constipation, cholestasis, internally and externally for inflammation and as a tranquilizer.

The plant contains iridoid glycosides—geniposide 56.03, genipin 1.72, gardenoside 2.16 and geniposidic acid 1.79 mg/g The stem and root contain oleanolic acid, D-mannitol and stigmasterol. The leaves contain an antifungal compound, cerbinal.

Geniposide is an important active principle of the fruit. The fruit also contain the carotenoids, crocin and crocetin. Aqueous and methonalic extracts of the fruit exhibited antioxidant activity due to the presence of geniposide and crocin; crocin was more potent than geniposide.

The extract as well as geniposide caused a remarkable decrease in GOT, GPT and ALP activities. They also produced a significant decrease in the level of total cholesterol in the serum of CCl4-induced and D-galactosamine-intoxicated rats. The crude extract as well as geniposide exhibited protective effect against induced hyperbilirubinemia by effectively lowering serum bilirubin.

Gardenia latifolia Ait.

Family ► *Rubiaceae.*

Habitat ► Throughout the greater part of India, mostly in dry forests.

English ► Boxwood Gardenia.

Ayurvedic ► Parpataki.

Siddha/Tamil ► Kumbay, Perungambil.

Folk ► Paaparaa, Ban-pindaalu.

Action ► Bark—used in skin diseases.

The stem bark contains hederagenin, D-mannitol, sitosterol and siaresinolic, episiaresinolic, oleanolic and spinosic acid.

Gardenia resinifera Roth.

Synonym ► *G. lucida* Roxb.

Family ► *Rubiaceae.*

Habitat ► Central India and Deccan Peninsula.

Ayurvedic ► Naadihingu (related species), Jantuka.

Unani ► Dikaamaali.

Siddha/Tamil ► Kambil, Kumbai, Dikkamalli.

Action ► Gum—antimicrobial, anthelmintic; used in skin diseases. Gum gave flavonoids—gardenins, wagonin derivatives, de-Me-tangeretin, nevadensin, hexacosyl-*p*-coumarate. See *G. gummifera.*

Gardenia turgida Roxb.

Synonym ► *Ceriscoides turgida* Roxb.

Family ► *Rubiaceae.*

Habitat ► Throughout the greater part of India, up to 1,360 m

Ayurvedic ► Mahaapindi, Karahaata, Kharahaara. (Bark is sold as Bhaargi.) Thanella.

Siddha/Tamil ► Nanjundam, Malangarai.

Action ► Root—used as a remedy for indigestion in children. Fruits—used in affections of the mammary glands. Pounded pulp is applied to forehead in fever.

The bark and wood gave beta-sitosterol, hederagenin, Me-esters of oleanolic and gypsogenic acids. Root gave gardnins.

Saponins from bark decreased formation of histamine and may find use in asthma. (Market drug is expectorant and weak spasmolytic, but was not found effective in asthma.)

Garuga pinnata Roxb.

Family ► *Burseraceae.*

Habitat ► Throughout India, up to 1,000 m on the hills.

English ► Grey Downy Balsam.

Ayurvedic ► Paaranki, Kharpata. (Kinkiraata, Karnikaara, Mrigalindika are doubtful synonyms.)

Siddha/Tamil ► Karre Vembu, Arunelli.

Folk ► Ghogar, Toon.

Action ► Fruit—stomachic. Leaf—astringent, antiasthmatic. Bark—antidiabetic.

The leaves and stem bark contain sterols, sitosterol, stigmasterol and campesterol; fatty acids; aliphatic compounds; a mixture of long chain esters; along with tannins and waxes. The leaves also contain garugarin and amentoflavone. Gum-resin contains alpha-amyrin, butyrospermol and dammarandiol.

Aqueous and ethanolic extract of the leaves exhibit anti-inflammatory and antiallergic activities.

Gaultheria fragrantissima Wall.

Family ► *Ericaceae.*

Habitat ► Central and Eastern Himalayas, Khasi Hills, Western Ghats, the Nilgiris and Travancore.

English ► Fragrant Wintergreen, Indian Wintergreen. (Wintergreen oil is obtained from *G. procumbens* Linn., a native of America.)

Ayurvedic ► Gandhapuura, Gandhapuurna.

Siddha/Tamil ► Kolakkaai.

Action ► Leaves—stimulant, carminative, diuretic, antiseptic. Oil (in the form of liniment or ointment)—applied externally in rheumatism, sciatica and neuralgia. The plant is strongly irritant.

The leaves gave hyperoside (quercetin-3-galactoside), ursolic acid, beta-sitosterol and essential oil containing methyl salicylate as a major constituent. The yield of oil from Assam plants contains 99.14% methyl salicylate. Heptyl aldehyde, present in the low boiling fraction of the oil, brought about the regression of tumours in mice and dogs.

Gelidium amansii Kutz.

Family ► *Gelidaceae, Rhodophyceae.*

Habitat ► Indigenous to Japan.

English ► Agar Agar, Japanese Isinglass. (Dried mucilaginous extract.)

Folk ► Agar-Agar.

Action ► Bulk-laxative. Agar-Agar does not increase peristaltic action. Its action is similar to that of cellulose of vegetable foods which aids the regularity of the bowel movement. (Often made into an emulsion with liquid paraffin for use in constipation.)

Most agars consist of two major polygalactoses, the neutral agarose and the sulphonated polysaccharide agaropectin, with traces of amino acids and free sugars.

Agar contains a large amount of pectin which may precipitate when exposed to alcohol. (Sharon M Herr.)

Gentiana kurroo Royle.

Family ► *Gentianaceae.*

Habitat ► Kashmir and North-West Himalayas.

English ► Himalayan Gentian, Indian Gentian Root.

Ayurvedic ► Traayamaana, Traayanti, Traayanta, Traayantikaa, Neelkanthi, Anujaa, Girijaa, Girishaanujaa,

G

Balbhra, Paalani. (Paakhaanabheda is a wrong synonym)

Unani ► Ghaafis.

Action ► Sialagogue, digestant, appetite-stimulant, antispasmodic, anti-inflammatory, emmenagogue. Used for alkalosis, feeble digestion in the elderly from gastric acid deficiency (increases gastric juices without altering PH); also used for jaundice, nausea, vomiting, travel sickness, diarrhoea, malaria and nervous exhaustion. (In Chinese medicine, *Gentiana* sp., known as Longdan, are used for jaundice, hepatitis, urinary tract infections, pruritis and eczema.)

G

Key application ► *Gentiana lutea*—internally, for digestive disorders, such as lack of appetite, fullness and flatulence (*German Commission E, WHO*), for anorexia following illness and dyspepsia (*ESCOP*). *The British Herbal Compendium* approves gentian for lack of appetite, anorexia, atonic dyspepsia, gastrointestinal atony, and as antiemetic. *The British Herbal Pharmacopoia* recognizes it as a bitter tonic.

The rhizome and roots of *G. Kurroo* contain iridoid glycoside; major component was identified as 6′-cinnamoylcatalpol.

The rhizomes and roots of *Picrorhiza kurrooa* Royle ex Benth., found in the Himalayas, have similar properties and uses and are mixed or substituted for those of *G. kurroo*.

Gentiana lutea (Yellow Gentian) is a native of Europe and Asia Minor and is imported into India. The most important constituents of the drug are secoiridoid bitter compounds, amarogentin and gentiopicroside, together with traces of swertiamarin and sweroside. The roots also contain alkaloids, gentianine and gentioflavine, xanthones, and bitter oligosaccharides, gentiobiose and gentianose.

Amarogentin, gentiopicrin, swertiamarin, sioeroside (iridoid monoterpenes) are toxic constituents.

Gentiana tenella Rottb., synonym *Gentianella tenella* H. Smith and *G. decumbens* Linn.f. occur at high altitudes in the Himalayas, and are used as substitutes for gentian. *G. tenella* is known as Kadu in Kashmir and Titaa in Punjab. The rhizome is used as Traayamaana in Ayurvedic medicine.

The flowering tops of *G. olivieri* Griseb., synonym *G. dahurica* Fisch., used in Unani medicine as Gul-e-Ghaafis, are imported into India from Persia.

Dosage ► Root—1–3 g powder. (*CCRAS.*)

Geophila repens
(Linn.) I. M. Johnson.

Synonym ► *G. reniformis* D. Don.

Family ► *Rubiaceae.*

Habitat ► Assam, Western Ghats and Andaman Islands.

Folk ► Karintakaali (Kerala).

Action ► Properties are similar (though inferior) to those of Ipeac (*Cephaelis ipecacuanha* A. Rich.).

Geranium nepalense Sweet.

Synonym ► *G. affine* W. & A.

Family ► *Geraniaceae.*

Habitat ► Temperate Himalayas, Kashmir, Khasi Hills and the Nilgiris.

English ► Nepal Geranium, Nepalese Crane's Bill.

Ayurvedic ► Bhanda, Bhandaa.

Folk ► Ratanjot (var.), Roel (Kashmir).

Action ► Astringent, styptic, used in renal diseases, diarrhoea, internal and external bleeding. Also used topically for ulcers and haemorrhoids.

The plant gave geraniin, kaempferol-7-rhamnoside and kaempferitrin. The leaves gave tannins.

EtOH (50%) extract of the plant exhibited hypotensive activity.

A gastrointestinal-contracting choline-like substance has been isolated from var. *thumbergii* and is found useful for the treatment of gastrointestinal disorders such as gastroptosis.

Geranium robertianum Linn.

Family ► *Geraniaceae.*

Habitat ► Western Himalayas from Kashmir to Garhwal at 2,000–2,700 m.

English ► Herb-Robert Geranium.

Action ► Haemostatic, astringent, antidiarrhoeic, styptic, antidiabetic.

The herb has a disagreeable odour and a bitter, saline and astringent taste. Applied externally as a resolvent to tumours.

In Western herbal, the herb is used for diarrhoea, to improve functioning of liver and gallbladder and to prevent the formation of calculi.

The herb contains several flavonoids including rutin. A ethanolic extract can inhibit the growth of *E. coli*, *P. aeruginosa* and *S. aureus*.

Geranium wallichianum D. Don ex Sweet.

Family ► *Geraniaceae.*

Habitat ► Western Himalayas from Kashmir to Kumaon at 2,350–3,700 m.

English ► Wallich Crane's Bill.

Ayurvedic ► Ratanjot (substitute).

Folk ► Laal Jadi, Laal Jahri. Kaoashund (Kashmir).

Action ► Astringent.

The root stocks sometimes substituted for those of *Coptis teeta* Wall.; contain 25–32% tannins and 18% non-tannins.

Geum urbanum auct. non Linn.

Family ► *Rosaceae.*

Habitat ► The temperate Himalayas from Kashmir to Kumaon at 3,000–3,700 m Grows wild in Europe and Great Britain.

English ► Avens Root, Herb Bennet, Wood Avens.

Action ► Astringent, styptic, stomachic, febrifuge.

The herb and root was used in Europe in chronic dysentery, diarrhoea and intermittent fevers. In India, an infusion of the rootstock is used as sudorific in fevers, ague, chills and catarrh.

Eugenol is present in the root stock in combination with vacianose as phenolic glycoside gein. The rootstock contains tannins (30–40%).

A related species, *G. elatum* Wall., is found in the Himalayas from Kashmir to Sikkim It is used for dysentery and diarrhoea.

Ginkgo biloba Linn.

Family ► *Ginkgoaceae.*

Habitat ► Native to China and Japan; cultivated in Indian gardens as an ornamental.

English ► Maidenhair tree called Living Fossils (in India), Kew tree.

Action ► Antagonizes bronchospasm, used as a circulatory stimulant, peripheral vasodilator.

Key application ► Standardized dry extract—for symptomatic treatment of disturbed performance in organic brain syndrome within the regimen of a therapeutic concept in cases of dementia syndromes—memory deficits, disturbance in concentration, depressive emotional conditions, dizziness, tinnitus and headache. (*German Commission E, ESCOP, WHO.*) As vasoactive and platelet aggregation inhibitor. (*The British Herbal Pharmacopoeia.*) (For pharmocological studies in humans and clinical studies, see *ESCOP.*)

The majority of pharmacological studies and clinical trials have been conduced using a standardized extract which contains 24% flavonoid glycosides (Ginko flavone glycosides) and 6% terpenoids (ginkgolides and bilobalide).

The extract increases tolerance to hypoxia and exhibits anti-ischaemic effect. It simultaneously improves the fluidity of blood, decreases platelet adhesion, decreases platelet and erythrocyte aggregation and reduces plasma and blood viscosity. The extract protects erythrocytes from haemolysis. The extract also decreases the permeability of capillaries and protects the cell membrane by trapping deleterious free radicals.

The extract also increased cerebral blood flow in about 70% patients evaluated (patients between 30–50 year age had 20% increase from the base line, compared with 70% in those 50- to 70-year-olds).

A reversal of sexual dysfunction with concurrent use of ginkgo with antidepressant drugs has been reported. (*Am J Psychiatry*, 2000 157(5), 836–837.)

The National Centre for Complementary and Alternative Medicine, USA, is conducting a 5-year study of 3000 people aged 75 and older to determine if ginkgo, 240 mg daily, prevents dementia or Alzheimer's disease. (www.clinicaltrials.gov/ct/gui/c/r). 2000.

Girardinia heterophylla Decne.

Synonym ► *G. diversifolia* (Link) Eriss.

Family ► *Urticaceae.*

Habitat ► Temperate and sub-tropical Himalayas from Kashmir to Sikkim, and in Assam and Khasi hills.

English ► Himalayan Nettle.

Ayurvedic ► Vrishchikaa.

Folk ► Bichhuu-booti, Awaa, Chikri.

Action ► Leaves—decoction is given in fevers; applied externally to swollen joints, also as a paste for headache. (Due to stringing hair, the plant causes dermatitis and is known as Bichhuu.)

The leaves contain 5-OH-tryptamine and histamine, also AC-choline. The plant gave beta-sitosterol.

Gironniera reticulata Thw.

Synonym ► *G. cuspidata* Kurz.

Family ► *Ulmaceae.*

Habitat ► Northeastern parts of India and in Deccan Peninsula.

Siddha/Tamil ► Kodaittani.

Folk ► Narakyaa-ood (Maharashtra, Indian bazar).

Action ► Blood-purifier in itch and cutaneous eruptions; mixed with lemon juice, applied externally.

The wood contains a skatole and silica (0.86–1.2%).

Gisekia pharnaceoides Linn.

Family ► *Aizoaceae.*

Habitat ► Drier parts of Northern and Western India and Deccan Peninsula.

Ayurvedic ► Elavaaluka (var.). (*Prunus cerasus* Linn., *Rosaceae*, is the accepted source of Elavaaluka.)

Folk ► Baalu-ka-saag, Morang, Sareli.

Action ► Anthelmintic. Fresh herb is used for taenia.

The plant contains triacontane, dotriacontane, myristone, sugars, and flavonoids.

Glinus lotoides Linn.

Synonym ► *Mollugo lotoides* (L.) O. Kuntze.
M hirta Thumb.

Family ► *Molluginaceae; Aizoaceae.*

Habitat ► Throughout the plains and lower ghats of India in river beds.

Siddha/Tamil ► Siru seruppadai.

Folk ► Gandhi-buuti.

Action ► Plant—antidiarrhoeal, antibilious, diuretic. Decoction is given in piles.

The plant gave pentacyclic triterpenoid sapogenins; a mixture of beta-and gamma-sitosterol, oleanolic acid, mollugogenol and its constituents. Aerial parts gave vitexin and vicenin.

Gloriosa superba Linn.

Family ► *Liliaceaes.*

Habitat ► Throughout tropical India, up to 2,350 m on the hills.

English ► Glory Lily, Super Lily, Tiger's Claws.

Ayurvedic ► Laangali, Laangaliki, Laangalaki, Laanglaahva, Indrapushpi, Agnishikhaa, Anantaa, Vishaalyaa, Halini, Sirikramaa, Shukrapushpikaa, Vahnimukhi, Garbhanut, Garbhapaatani. Kalihaari (*Costus specious* Koen., is also used as Kalihaari), Kalikaari.

Siddha/Tamil ► Kalappankizhangu.

Action ► Tuberous root—anti-inflammatory, alterative, anthelmintic, antileprotic. Used for piles, swollen joints, parasitical affections of skin. Fresh juice of plant—uterine stimulant.

The root contain colchicine 0.23–0.3%. Colchicine and its derivatives are present in tubers, seeds and flowers.

The seeds are used as raw material for preparing drugs for gout. They are considered a rich source of colchicine and gloriosine.

The herb is a gastrointestinal irritant.

Dosage ► Detoxified tuberous root—125–250 mg. (*API* Vol. III.)

Glossocardia bosvallia DC.

Synonym ► *G. linearifolia* Cass.

Family ► *Compositae; Asteraceae.*

Habitat ► Plains of Northern and Western India and Deccan Peninsula.

Ayurvedic ► Parpata (substitute). (*Fumaria parvifolora* Linn., *Hedyotis corymbosa* (L.) Lam synonym *Oldenlandia corymbosa* Linn., *Mollugo cerviana* (L.) Ser., *Justicia procumbens* Linn., *Polycarpea corymbosa* Lam are also used as Parpata for fevers.)

Siddha ► Parapalanamu.

Action ► Used as emmenagogue.

The essential oil from the plant is antimicrobial, that from flowers anthelmintic.

Glycine max Merrill.

Synonym ► *G. soja* Sieb. & Zucc. *G. hispida* Maxim.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Native to South East Asia; now cultivated as pulse crop mainly in Punjab, Haryana, Uttar Pradesh, Himachal Pradesh, Maharashtra, Gujarat, Naga Hills, Mainpur and Kashmir.

English ► Soybean, Soya.

Folk ► Soyabean, Raam Kurthi, Bhat.

Action ► Used as a protein supplement. (Products include fortified wheat flour, soymilk, snack foods, cooking oil.)

Key application ► Soy lecithin (phospholipids extracted from the seeds of *G. max*)—used for moderate disturbances of fat metabolism, especially hypercholesterolaemic (if dietary measures are not sufficient). (*German Commission E.*)

Soybean is rich in protein, oil and minerals, but low in carbohydrates. It also contains water-and fat-soluble vitamins. The major portion of soy protein is composed of glycinin and beta-conglycinin.

Wheat flour can be fortified with full-fat or defatted soyflour for balancing it in essential amino acids, lysine and methionine.

Soy saponins are divided into three groups according to their respective type of aglycon, soyasapogenol A, B and E. Saponin A and AB group fraction protects the liver against antioxidation and improved lipid metabolism in the injured liver.

Administration of a small peptide derived from soybean showed antifatigue, antiobesity and hypoglycaemic activity in mice.

Feeding soy protein to hamsters, consistently, resulted in significantly reduced incidence of gallstones.

In studies of experimental carcinogenesis in animals, soybean isoflavones exhibited protective effect in 65% animals.

Glycosmis pentaphylla (Retz.) DC.

Synonym ► *G. arborea* (Roxb.) A. DC.
G. cochinchinensis Gamble.
Limonia pentaphylla Retz.

Family ► *Rutaceae.*

Habitat ► Peninsular India and Andaman Islands. Cultivated in gardens.

Ayurvedic ► Vana-nimbuukaa, Ashwa-shaakhota.

Siddha/Tamil ► Konji, Amam, Kula-pannai.

Folk ► Bana-Nimbu, Paanal (Kerala).

Action ► Plant—bechic, anti-anaemic, antirheumatic. Root—anti-inflammatory. Leaf—used in Jaundice and liver disorders, eczema and other skin affections. Leaf and root—vermifuge, febrifuge. A paste of the wood is applied externally to pimples.

Leaf extract from a Sri Lankan plant yielded the alkaloids arborine, skimmianine and arborinine. The steam distillate of leaves showed significant antifungal activity.

Glycyrrhiza glabra Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Native to the Mediterranean regions. Now grown in Punjab, Jammu and Kashmir and South India.

English ► Licorice, Liquorice.

Ayurvedic ► Yashtimadhu, Madhuyashtyaahvaa, Madhuli, Madhuyashtikaa, Atirasaa, Madhurasaa, Madhuka, Yastikaahva, Yashtyaahva, Yashti, Yashtika, Yashtimadhuka. Klitaka (also equated with *Indigofera tinctoria*). (Klitaka and Klitanakam were considered as aquatic varieties of Yashtimadhu.)

Unani ► Asl-us-soos, Mulethi. Rubb-us-soos (extract).

Siddha/Tamil ► Athimathuram.

Action ► Demulcent, expectorant, antiallergic, anti-inflammatory, spasmolytic, mild laxative, anti-stress, antidepressive, antiulcer, liver protective, estrogenic, emmenagogue, antidiabetic. Used in bronchitis, dry cough, respiratory infections, catarrh, tuberculosis; genitourinary diseases, urinary tract infections; abdominal pain, gastric and duodenal ulcers, inflamed stomach, mouth ulcer. Also used for adrenocorticoid insufficiency.

Key application ► In catarrh of the upper respiratory tract and gastric, duodenal ulcers. (*German Commission E, ESCOP, WHO.*)

The British Herbal Compendium indicates the use of liquorice for bronchitis, chronic gastritis, peptic ulcer, rheumatism and arthritis, adrenocorticoid insufficiency, and to prevent liver toxicity. *Indian Herbal Pharmacopoeia* recognizes its use as an anti-inflammatory and antiulcer agent.

The main chemical constituent of liquorice is glycyrrhizin (about 2–9%), a triterpene saponin with low haemolytic index. Glycyrrhetinic (glycyrrhetic) acid (0.5–0.9%), the aglycone of glycyrrhizin is also present in the root. Other active constituents of liquorice include isoflavonoids, chalcones, coumarins, triterpenoids and sterols, lignans, amino acids, amines, gums and volatile oils.

Hypokalemia is the greatest threat when liquorice preparations high in glycyrrhizin are prescribed for prolonged periods. Liquorice causes fluid retention. Patients should be placed on a high potassium and low sodium diet. Special precautions should be taken with elderly patients and patients with hypertension or cardiac, renal or hepatic disease.

A special liquorice extract known as DGL (deglycyrrhizinated liquorice) is used in the treatment of peptic ulcer. Oral liquorice preparations, containing glycyrrhetinic acid, are used for the treatment of viral infections—viral hepatitis, common cold. Topical preparations, containing glycyrrhetinic acid, are used for herpes, eczema, psoriasis.

In Japan, a preparation of glycyrrhizin, cysteine and glycine is used by injection for the treatment of acute and chronic hepatitis.

Dosage ► Root—2–4 g powder. (*API* Vol. I.)

Gmelina arborea Roxb.

Synonym ► *Premna arborea* Roth.

Family ► *Verbenaceae.*

Habitat ► Throughout India, up to 1,700 m on the hills and in Andaman Island; also grown in gardens.

English ► Candahar tree, White Teak.

Ayurvedic ► Gambhaari, Kaashmari, Kaashmarya, Sarvatobhadraa, Bhadra, Mahaabhadraa, Sadaabhadraa, Madhuparnikaa, Sriparni, Pitarohini, Hiraa, Bhadraparni, Trishati.

Siddha/Tamil ► Kattanam, Kumizham

Action ► Leaf—demulcent, bechic. Used for removing foetid dis-

charges from ulcers. Root—stomachic, laxative, antibilious, demulcent, galactagogue. Bark—anticephalalgic. Root and bark—febrifuge.

The Ayurvedic Pharmacopoeia of India recommends the use of the bark and stem in inflammatory diseases and oedema; the fruit in dysuria and haemorrhagic diseases.

The heartwood contains lignans, arborone, 7-oxodihydrogmelinol, paulownin acetate and epieudesmin; me-trans-*p*-methoxycinnamate and trans-*p*-hydroxycinnamic acid.

Alcoholic extract of stem bark showed anti-inflammatory activity comparable to phenylbutazone.

Dosage ▶ Root, root bark—20–30 g for decoction. (*API* Vol. I.)

Gmelina asiatica Linn.

Synonym ▶ *G. parvifolia* Roxb.

Family ▶ *Verbenaceae.*

Habitat ▶ South India; planted in gardens in Maharashtra and West Bengal.

English ▶ Small Cashmere tree.

Ayurvedic ▶ Gambhaari (related species), Gopabhadra, Vikarini.

Siddha/Tamil ▶ Kumizham

Action ▶ Root and leaf—demulcent, alterative, blood purifier (used in venereal diseases), anticatarrhal, astringent, antirheumatic.

The plant contains lignans of the furofuran series.

The leaves show antibiotic activity against *E. coli* and *Staphylococcus aureus.*

Gnaphalium luteo-album Linn.

Family ▶ *Asteraceae.*

Habitat ▶ Throughout India, ascending up to 3,350 m in the Himalayas.

English ▶ Jersey Cudweed, Cotton Weed, Cat's Foot, Everlasting Flower.

Folk ▶ Bal-raksha.

Action ▶ Leaves—astringent, haemostatic, vulnerary. The tomentum is applied as counter-irritant in gout, also used as tinder.

Gnetum montanum Markgraf.

Synonym ▶ *G. scandens* Roxb. in part.

Family ▶ *Gnetaceae.*

Habitat ▶ Tropical Himalayas from Nepal to Bhutan, Assam and Meghalaya.

English ▶ Joint Fir.

Siddha/Tamil ▶ Anapendu, Peiodal (*G. ula.*)

Action ▶ Seed oil—antirheumatic. Plant— antiperiodic. Leaves—piscic.

The stem-wood yielded bergenin, acetophenone and stilbene derivatives.

G

G. ula Brongn. non-Karst is found in evergreen forests of Western and Eastern Ghats up to 1,800 m.

Gnida glauca (Fresen.) Gilg.

Synonym ► *G. eriocephalus* Meis. *Lasiosiphon glaucus* Fresen. *L. eriocephalus* (Meisner) Decne.

Habitat ► Western Ghats.

Action ► Leaf—anti-inflammatory; used for contusions and swellings. Plant—vesicant.

The plant contains bicoumarins, lysocephalin and lasiocrin; a coumarin glucoside, crioside, and a bicoumarin glycoside, eriocephaloside. The plant also gave ingiresinol, syringin, genkwanin and its glycoside, beta-sitosterol and its glucoside.

Gordonia obtusa Wall.

Family ► *Theaceae.*

Habitat ► Konkan and Western Ghats.

Folk ► Miyili, Atangi, Ola, Nagette, Thorilla (Tamil Nadu).

Action ► Leaves—stomachic, appetizer.

Leaves contain 0.04% alkaloid and tannic acid. The bark contains ellagic acid and coumarin.

Gossypium arboreum Linn.

Family ► *Malvaceae.*

Habitat ► Cultivated all over India as a fibre plant.

English ► Tree Cotton, Desi Cotton.

Ayurvedic ► Kaarpaasi.

Siddha/Tamil ► Sempartthi (Red Cotton), Sivappuparutthi.

Folk ► Kapaasa.

Action ► Seed—anticatarrhal (used in consumption), antigonorrhoeic (used in gleet and chronic cystitis). Root—febrifuge. Plant (especially leaf)—uterine stimulant.

The glands contain 35–50% gossypol, a polyphenolic toxic compound. Seeds contain 18.5–25.4% protein, 0.57–2.38% free gossypol. Gossypol is a male contraceptive. At an initial dose of 20 mg/day orally for 3 months, followed by 50–60 mg weekly maintenance dose, sperm motility is reduced initially as it inhibits important enzymes of metabolic pathways thus affecting availability of enzyme to spermatozoa. Subsequently sperm production is blocked.

Gossypol is reported to cause a transient weakness early in therapy, hypokalaemia and changes in ECG among other side effects.

Gossypol also assists menstrual flow and effectively inhibits eggs implantation.

Gossypol and its derivatives have been shown to have significant antimicrobial activity as well as wound healing effect. It is reported to kill herpes virus.

Gossypium barbadense Linn.

Family ► *Malvaceae.*

Habitat ► Native to South America, particularly its north-western parts. Also cultivated in India.

English ► Egyptian Cotton, Sea-Island Cotton.

Ayurvedic ► Kaarpaasa.

Siddha/Tamil ► Semparutthi.

Folk ► Kapaasa.

Action ► Root—emmenagogue, oxytocic, abortifacient, parturient, lactagogue. Seed and leaf—antidysenteric. Seed—galactogogue, pectoral, febrifuge. Seed oil—used externally for clearing spots and freckles from the skin. Leaf—hypotensive, antirheumatic. Flower—used in hypochondriasis and bronchial inflammations.

The seed contains 26.2–27.9% protein; 1.22–2.42 free gossypol.

Gossypium herbaceum Linn.

Family ► *Malvaceae.*

Habitat ► Cultivated mainly in Maharashtra, Tamil Nadu, Andhra Pradesh and Karnataka.

English ► Asiatic Cotton, Levant Cotton, Uppam Cotton.

Ayurvedic ► Kaarpaasa, Kaarpaasi, Kaarpaasaka, Rakta-Kaarpaasa, Shona-Kaarpaasa, Samudraantaa, Tuula, Pichu, Bhaaradwaaji, Tundikeri.

Unani ► Pambahdaanaa. (Seed.)

Siddha/Tamil ► Paruttikkootam

Action ► Root bark—diuretic, oxytocic. Bark—emmenagogue, haemostatic. Seed—demulcent, laxative, expectorant, abortifacient, galactagogue, nervine, anticephalalgic.

The Ayurvedic Pharmacopoeia of India recommends the seed oil for toning up the breast.

The seed contains 21.3–25.2% protein, free gossypol 0.82–1.96%.

Dosage ► Seeds, devoid of lint—3–6 g powder. (*API* Vol. I.)

Gouania leptostachya DC.

Synonym ► *G. tiliaefolia* Lam.

Family ► *Rhamnaceae.*

Habitat ► Sub-Himalayan region from Kangra eastwards and in parts of Assam, Bengal, Bihar, Orissa and Andhra Pradesh.

Folk ► Batvaasi (Nepal), Batvaasi (Bengal), Bitkil-chaand (Bihar).

Action ► Leaves—used in poultices for sores. Bark—used for washing hair for destroying vermin.

The bark and root contain saponin.

The leaves of a related species, *Gouania microcarpa* DC., found in Peninsular India from Konkan southwards, gave a triterpenic acid, along with tetratriacontanoic acid.

Gracilaria lichenoides (Linn.) Harv.

Family ► *Rhodophyceae.*

Habitat ► The coasts of Indian Ocean and Chilka Lake.

English ► Moss.

Folk ► Chinai-ghaas. Known as Ceylon Agar-Agar or Agal-Agal.

Action ► Emollient, diuretic, alterative. Aqueous extract—antihypotensive and spasmolytic.

Aqueous extract contains prostaglandins.

G

Grangea maderaspatana Poir.

Synonym ► *Artemisia maderaspatana* Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout the greater part of India.

Ayurvedic ► Aakaarakarabha substitute (doubtful).

Siddha/Tamil ► Maasipathri.

Folk ► Mastaru, Mukhatari, Maachipatri (Maharashtra).

Action ► Leaf—stomachic, antispasmodic, sedative, emmenagogue, deobstruent, antiseptic. Used in amenorrhoea.

Aerial parts of the plant afforded clerodane derivatives. Presence of phytol, lupeol, *p*-hydroxybenzoic acid, a phenylalanine derivative, hardwickiic acid, strictic acid and butenolides, is reported. *Aura amide* was also isolated from the aerial parts.

A mixture of flavonoids extracted from the aerial parts exhibited oestrogenicity and anti-implantation activity in mice. A crude extract of the plant exhibited strong cytotoxic activity.

Graptophyllum picum (L.) Griff.

Synonym ► *G. hortense* Nees. *Justica picta* L.

Family ► *Acanthaceae.*

Habitat ► A native to Polynesia; introduced into Indian gardens.

English ► Caricature Plant.

Folk ► Kaalaa-aduusaa (Maharashtra). Ysjudemaram (Tamil Nadu).

Action ► Leaves—emollient and resolvent; applied to swellings and ulcers. (Used as a substitute for *Adhatoda vasica*).

Grewia asiatica auct. non L.

Synonym ► *G. subinaequalis* DC.

Family ► *Tiliaceae.*

Habitat ► Extensively cultivated in India.

Ayurvedic ► Parushaka, Parusha.

Unani ► Phaalsaa.

Siddha/Tamil ► Palisa, Thadachi.

Action ► Fruit—stomachic, astringent, cooling. Bark—demulcent. Root bark—antirheumatic. Leaf—used in pastular eruptions.

The bark contains taraxasterol, beta-sitosterol, erythrodiol; lupeol, betulin, lupenone, friedelin; alpha-amyrin. The

heartwood gave beta-sitosterol. Quercetin, kaempferol and their glycosides were also obtained from the leaves.

Ripe fruits are rich in vitamin A and C; threonine, phosphoserine, serine and taurine are the dominant amino acids in the juice. The fruits also contain sodium 22, potassium 1250, and calcium 260 ppm

Fruits also gave pelargonidin-3, 5-diglucoside, quercetin, quercetin-3-0-beta-D-glucoside, naringenin and 7-0-beta-D-glucoside.

The stem bark exhibited antifertility activity.

Dosage ► Ripe fruit—20–50 ml juice. (*CCRAS.*)

Grewia hirsuta Vahl.

Synonym ► *G. polygama* Mast.

Family ► *Tiliaceae.*

Habitat ► Sub-Himalayan tract from the Indus to Nepal up to 1,500 m, also in hills of Bihar, Orissa and Tamil Nadu.

Ayurvedic ► Naagabalaa, Gud-sharkaraa.

Siddha/Tamil ► Tavadu.

Folk ► Gulshakari.

Action ► Fruit and root—diuretic, antidiarrhoeal. Roots and leaves, crushed with sugar candy, are prescribed for spermatorrhoea.

Dosage ► Root—50–100 ml decoction. (*CCRAS.*)

Grewia populifolia Vahl.

Synonym ► *G. tenax* (Forsk.) Aschers & Schwf.

Family ► *Tiliaceae.*

Habitat ► Cultivated in Punjab, Sind, Rajasthan and Western India, down to the Nilgiri Hills.

Ayurvedic ► Gaangeru(ki). Substitute for Gulshakari (Naagabalaa).

Siddha/Tamil ► Achhu.

Folk ► Gangeran.

Action ► See *G. hirsuta.*

The stem bark contains triterpenoids.

Dosage ► Root—10–20 ml juice; 50–100 ml decotion. (*CCRAS.*)

Grewia sclerophylla Roxb. ex G. Don.

Synonym ► *G. scabrophylla* Roxb. *G. obliqua* auct. non-Juss.

Family ► *Tiliaceae.*

Habitat ► Sub-Himalayan tract and outer hills from Kumaon to Bhutan up to 1,200 m and in Assam

Ayurvedic ► Parushaka (related species), Dhanvana (related species)

Siddha/Tamil ► Kattu Kadali.

Folk ► Jangali Phaalsaa.

Action ► Root—emollient, bechic. Used in irritable conditions of the intestines and bladder.

Grewia tiliaefolia Vahl.

Family ► *Tiliaceae.*

Habitat ▶ Upper Gengetic plain, Bihar, Bengal, Central and Peninsular India.

English ▶ Dhaman.

Ayurvedic ▶ Dhanvana, Dhanurvriksha.

Siddha/Tamil ▶ Tarra, Unnu, Sadachi.

Folk ▶ Dhaamin, Dhaaman.

G

Action ▶ Bark—antidysenteric. Stem bark—semen coagulant. Plant—used in fractures.

The roots and bark gave triterpenoids.

A related species, *Grewia optiva*, found in sub-Himalayan tract at 500–2,000 m, is also known as Dhaaman.

Grewia villosa Willd.

Family ▶ *Tiliaceae.*

Habitat ▶ Punjab, Rajasthan, Gujarat, Andhra Pradesh and Tamil Nadu.

English ▶ Tamthar.

Siddha/Tamil ▶ Kullai.

Folk ▶ Dhohan (Rajasthan), Jalidar (Punjab), Kharamati (Maharashtra).

Action ▶ Root—antidiarrhoeal. Root and bark—used in genitourinary infections, syphilis and smallpox.

The methanol extract of the roots contain beta-carboline alkaloids, harman, harmine, harmol, harmalol and harmaline.

The roots are also used to treat cough.

Guaiacum officinale Linn.

Family ▶ *Zygophyllaceae.*

Habitat ▶ Introduced from the West Indies; grown as an ornamental.

English ▶ Lignum Vitae, Tree-of-life, Pockwood tree.

Ayurvedic ▶ Jivadaaru, Loha-Kaashtha.

Unani ▶ Chob-hayaat.

Folk ▶ Loha-lakkar.

Action ▶ Antirheumatic, anti-inflammatory, mild laxative, diuretic, diaphoretic, fungistatic (During the sixteenth century it was used as a cure for syphilis.)

Key application ▶ As a supportive therapy for rheumatic complaints. (*German Commission E.*) *The British Herbal Pharmacopoeia* reported anti-inflammatory activity in the resin.

Several triterpene saponins, sapogenins and prosapogenins have been isolated from different parts of the plant.

A triterpenoidal saponin, isolated from the flowers, showed activity against Gram-negative bacteria. (The herb is used as a additive to mouth washes.)

Guazuma ulmifolia Lam.

Synonym ▶ *G. tomentosa* H. B. & K.

Family ▶ *Sterculiaceae.*

Habitat ▶ Native to tropical America. Cultivated as a roadside shade tree in warmer parts of the country.

English ▶ Bastard Cedar.

Ayurvedic ▶ Pundraaksha, Rudraakshi (fake Rudraaksha).

Siddha ▶ Rudraksham and allied names are misnomers for this plant. (Rukraaksha is equated with *Elaeocarpus ganitrus* Roxb.)

Action ▶ Fruit—anticatarrhal (used in bronchitis). Bark—demulcent, sudorific. Used in skin diseases. Seed—astringent, carminative, antidiarrhoeal.

The plant gave kaempferol glycosides. Leaves contain octacosanol and taraxerol-OAC, friedelin-3-alpha-OAC, 3 beta-ol and beta-sitosterol. Bark contains friedelin, betulin and beta-sitosterol.

Guettarda speciosa Linn.

Family ▶ *Rubiaceae.*

Habitat ▶ Native to tropical America; occurs in tidal forests of South India and in Andaman Islands. (An extract of flowers, resembling rose-water, in sold in Travancore markets.)

Action ▶ Bark—used in chronic dysentery; also applied to wounds and abscesses.

Guizotia abyssinica Cass.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Native to tropical Africa. Cultivated in Madhya Pradesh, Andhra Pradesh, Karnataka and Orissa.

English ▶ Nigerseed.

Siddha/Tamil ▶ Pey Ellu, Uch Ellu.

Folk ▶ Raam-til, Kaalaa Til, Sargujaa.

Action ▶ Oil from seed—antirheumatic.

The seeds yield an oil (33%), a mixture of triglycerides, lauric, palmitic, palmitoleic, stearic, oleic, linoleic and arachidic acids. The unsaponifiable matter is a mixture of stigmasterol, *n*-triacontane and lupeol. Seeds contain lysine.

Gymnema hirsutum Wight & Arn.

Family ▶ *Asclepiadaceae.*

Habitat ▶ Southern parts of Uttar Pradesh adjoining Madhya Pradesh, also in Bihar and Western Ghats.

Folk ▶ Gurmaar (related species).

Action ▶ Leaf—when chewed, temporarily paralyses the sense of taste for sweet and bitter substances. Plant—used as stomachic, bechic, expectorant, and in male impotency, poor lactation.

The leaves contain gymnemic acid.

Gymnema montanum Hook. f.

Family ▶ *Asclepidaceae.*

Habitat ▶ Western Ghats from Konkan southwards.

Folk ▶ Gurmaar (related species).

Action ▶ See *G. sylvertre.*

The leaves contain gymnemic acid.

Gymnema sylvestre B. Br.

Family ► *Asclepiadaceae.*

Habitat ► Central and Peninsular India.

English ► Australian Cow Plant, Ipecacuanha (Indian).

Ayurvedic ► Meshashringi, Meshavishaanikaa, Meshavalli, Chhaagalshrngi. Ajashringi (also equated with *Dolichandrone falcata* and *Pergularia extensa*).

Unani ► Gurmaar Buuti.

Siddha/Tamil ► Kannu Minnayamkodi, Passaam, Shirukurinja.

Action ► Leaf—antidiabetic. Stimulates the heart and circulatory system, activates the uterus. Used in parageusia and furunculosis. Plant—diuretic, antibilious. Root—emetic, expectorant, astringent, stomachic.

Gymnemagenin, the main sapogenin in the leaves, yielded 3.9–4.6% of total gymnemic acids.

Gymnemic acids are antisweet principles and exhibit inhibitory effect on levels of plasma glucose.

The extract of dried leaves, given to diabetic rats at a dose of 20 mg/day per rat for 8 weeks, was found to bring about blood glucose homoeostasis by increasing serum insulin levels. Increased glycoprotein level and the resultant nephropathy, retinopathy and micro-and macro-angiopathy were also controlled.

The leaf extract (25–100 mg/kg), when orally administered to experimentally induced hyperlipidaemic rats for 2 weeks, reduced the elevated serum triglyceride and total cholesterol in a dose-dependent manner. The efficacy and antiatherosclerotic potential of the extract (100 mg/kg) were comparable to that of a lipid lowering agent, clofibrate.

In homoeopathy, a drug obtained from the leaves and roots is prescribed for both diabetes mellitus and insipidus

Gymnemic acid is reported to inhibit melanin formation *in vitro*. It also inhibits dental plaque formation.

Dosage ► Root, leaf—3–5 g powder; 50–100 ml decoction. (*CCRAS.*)

Gymnosporia spinosa (Forsk.) Fiori.

Synonym ► *G. Montana* (Roth) Benth.
Maytenus senegulensis Exell.
M. emarginata Ding Hou.

Family ► *Celastraceae.*

Habitat ► Throughout the drier parts of India.

Ayurvedic ► Vikankata (substitute) Sruva-Vrksha (substitute), Vyaaghrapaadi.

Siddha/Tamil ► Kattangi, Nandunarai, Valuluvai.

Folk ► Baikal.

Action ► Plant—antispasmodic. Root—used in gastroenteritis and dysentery.

The bark is ground to a paste and applied with mustard oil to kill lice in the hair. A decoction of leafy twigs is used as a mouth wash to relieve toothache.

The leaves contain celacinnine, alpha-and beta-amyrin, beta-amyrone, beta-sitosterol and its 3′-O-glucoside and kaempferol. The extracts of the plant show cytotoxic effect on some cancers. An ointment, prepared by mixing leaf ash and purified butter, is used for sores.

Gynandropsis gynandra (Linn.) Briq.

Synonym ► *G. pentaphylla* DC. *Cleome gynandra* Linn.

Family ► *Capparidaceae.*

Habitat ► Throughout warmer parts of India.

Ayurvedic ► Tilaparni (white var.), (Pita or yellow-flowered var. is equated with *Cleome viscosa* Linn.), Ajagandhaa, Pashugandhaa, Ugragandhaa, Puutigandhaa, Barbaraka. Suuryaavartta has been equated with *G. pentaphylla* DC.

Siddha/Tamil ► Thaivelai, Nalvelai.

Action ► Leaves and seeds—used in the same way as mustard. Bruised leaves—rubefacient and vesicant, used as counter-irritant in headache, neuralgia, rheumatic affections. Roots—decoction, febrifuge. Seeds—anthelmintic; externally counter-irritant. Applied as poultice to sores with maggots. An infusion is given for coughs.

The Ayurvedic Pharmacopoeia of India recommended the use of the seed in chlorsis, chronic obstructive jaundice and enlarged prostate.

The seeds are reported to contain cleomin, hexacosanol, free beta-sitosterol and kaempferol; also glucosinolates.

Alcoholic extract of the whole plant exhibited anti-inflammatory activity in carrageenan-induced inflammation in rats.

The medicinal properties of the seeds are attributed to the presence of cleomin. Seeds also contain 1% tannins.

Dosage ► Seed—1–3 g powder. (*API* Vol. I.) Leaf—50–100 ml decoction. (*CCRAS.*)

Gynocardia odorata R.Br.

Synonym ► *Hydnocarpus odorata* Landl.

Family ► *Flacourtiaceae.*

Habitat ► Eastern Himalayas, Khasi Hills and Sikkim.

Ayurvedic ► Chaalmograa (substitute). Tuvaraka (var.) (Controversial synonyms.)

Unani ► Tukhm-e-Biranj Mograa.

Folk ► Chaaval-mungari.

Action ► Oil from seed used in psoriasis, eczema, scrofula, gout, rheumatic affections.

A triterpenoid ketolactone, odolactone, has been isolated from the plant.

The fruit pulp is used as piscic.

The seeds of G. odorata were formerly, erroneously, thought to be the source Chaalmograa oil of commerce obtained from the seeds of *Hydnocar-*

pus kurzii, used in leprosy. Gynocardia oil does not contain chaulmoogric or hydnocarpic acid.

Gynura pseudo-china (L.) DC.

Synonym ► *G. nudicaulis* Arn.

Family ► *Asteraceae, Compositae.*

Habitat ► Eastern Himalaya, Sikkim, Assam, and Western Ghats in Tamil Nadu and Kerala.

Action ► Plant—emollient, resolvent. Used as a poultice in erysipelas and for tumours in the breast. Root—used both externally and internally for enhancing blood circulation especially when blue spots and blotches result from blows. The powdered root, mixed with tea, is given to parturient women. Leaves—used for poulticing pimples. The juice is used asa gargle for inflammations of the throat.

H

Habenaria edgeworthii
Hook. f. ex Collett.

Family ► *Orchidaceae.*

Habitat ► Outer range of Western Himalayas from Punjab to Kumaon.

Ayurvedic ► Riddhi. (Tubers of *Eulophia nuda* Lindl. and *Dioscorea bulbifera* are also used as Riddhi.)

Action ► Nervine and cardiac tonic.

Habenaria intermedia D. Don.

Family ► *Orchidaceae.*

Habitat ► The Himalayan region. Found in Ranikhet.

Ayurvedic ► Riddhi, Vriddhi. (Substitute: *Dioscorea bulbifera.*)

Action ► Nervine and cardiac tonic.

Habenaria acuminata Thw., *H. goodyeroides* D. Don., *H. griffithii* HK. are also equated with Riddhi, Vriddhi.

Dosage ► Tuber—3–6 g powder. (*CCRAS.*)

Haematoxylon campechianum
Linn.

Family ► *Caesalpiniaceae, Mimosaceae*

Habitat ► Native to tropical America and the West Indies. Grown in Indian gardens.

English ► Logwood, Peachwood, Compeachy tree.

Ayurvedic ► Pattanga, Patraanga, Bakam (substitute). (*Caesalpinia sappan* is also equated with Pattanga.)

Unani ► Buqqam, Bakam-Hindi.

Action ► Astringent. Used for atonic dyspepsia, diarrhoea, summer diarrhoea, dysentery, internal haemorrhages, menorrhagia, leucorrhoea. (It imparts red colour to urine and stool. Incompatible with chalk or lime-water.)

The wood contains about 10% haematoxylon, a red-brown phenolic dye, tannins, resin and volatile oil.

Haematoxylin exhibited significant anti-inflammatory activity in the carrageenan-induced oedema test.

The seed contains crude protein 29.1, pentosan 6.6, and water-soluble gum 3.2%.

Haplanthus verticillatus
(Roxb.) Nees.

Family ► *Acanthaceae.*

Habitat ► Hills of Deccan Peninsula and parts of western and central India.

Folk ► Kaalaa-Kirayaat (Maharashtra).

Action ► Febrifuge, bitter tonic.

A closely related species, *Haplanthus tentaculatus* Nees, is also known as Kaalaa-Kiryaat. The herb is given in fever.

Hardwickia binata Roxb.

Family ► *Caesalpiniaceae.*

Habitat ► Dry forests of Deccan Peninsula, Central India and parts of Uttar Pradesh and Bihar.

Ayurvedic ► Anjana.

Siddha/Tamil ► Katudugu, Kodapalai.

Action ► Balsam—used for sexually transmitted diseases. The balsam is similar to Copaiba balsam (*Copaifera langsdorffii* Desf., *Leguminosae*) of Brasil and is used in leucorrhoea, chronic cystitis, gonorrhoea, combined with cubebs and sandal. The resin (not the oleo-resin) is used as diuretic.

The essential oil of *H. binata* is not a substitute for Copaiba oil.

The methanolic extract of the heartwood yields beta-sitosterol, (+)-taxifolin, eriodictyol, (+)-catechin, (+)-epicatechin and (+)-mopanol. The phenolic compounds are said to impart antibacterial and antifungal property to the herb.

The bark has a good absorption capacity for mercury from water.

Hedera helix Linn.

Synonym ► *H. rhombea* Sieb. & Zucc.

Family ► *Araliaceae.*

Habitat ► Hills of Tamil Nadu. Grown in gardens as an ornamental.

English ► Common Ivy, Bentwood.

Siddha/Tamil ► Maravalai.

Action ► Leaf—expectorant, antispasmodic, antineuralgic, vasoconstrictive.
Fruit—used in jaundice, haemptysis. Flower—antidysenteric. Leaf and resin—emmenagogue. Tender twigs—boiled in butter, used for sunburn. Extracts are used in some cosmetic preparations.

Key application ► In catarrh of the upper respiratory passages, symptomatic treatment of chronic inflammatory bronchial conditions. (*German Commission E.*)

The stem and bark gave triterpene glycosides, named kizuta saponins. Oleanolic acid glycoside was also obtained from the plant but the presence of emetine could not be confirmed in subsequent work. The fruits gave hederagenin glycosides.

Emetin has been isolated from European and British plant. The fruit and hederagenin glycosides exhibit molluscacidal activity. Emetine-containing plant is amoebicidal.

Hedera nepalensis Koch.

Synonym ► *H. helix* auct. non Linn. *H. himalaica* Tobler.

Family ► *Araliaceae.*

Habitat ► The Himalayas; from Kashmir to Bhutan at 1,500–2,000 m and Assam at 1,350–2,000 m.

English ► Nepal Ivy.

Folk ► Baandaa, Bandaa, Lablab.

Action ► Leaves and berries—cathartic, diaphoretic, febrifuge, antispasmodic, expectorant. Used in whooping cough. Leaves—used in glandular enlargements. A decoction of the leaves is used topically to destroy lice in the hair. An infusion of berries is given in rheumatism. Gum—emmenagogue.

The inflorescences contain beta-amyrin, beta-sitosterol and its D-glucoside, oleanolic acid, triterpene glycosides, nepalins. Nepalins 1,2 and 3 at 0.5, 0.25 and 0.125% respectively completely immobilize human sperm.

Plant extract exhibited antitumour activity *in vivo* and *in vitro* against *Ehrich ascites.*

Hedychium coronarium Koenig.

Family ► *Zingiberaceae.*

Habitat ► Throughout the moist parts of India, up to 2,000 m. Also grown in gardens of Assam and South India.

English ► Ginger Lily.

Ayurvedic ► Shati (related species).

Action ► Anti-inflammatory, antirheumatic, febrifuge, tranquilizer.

The rhizomes gave furanoditerpene, hedychenone, an anti-inflammatory principle, also cytotoxic principles as labdane-type diterpenes.

The essential oil from rhizome shows anthelmintic and mild tranquilizing property. The essential oil contains alpha- and beta-pinene, limonene, carene, and its oxide, linalool and elemole in varying concentrations. The essential oil also gave borneol, methyl salicylate, eugenol and methylanthranilate.

Hedychium spicatum Ham. ex Smith.

Synonym ► *H. album* Buch-Ham. Ex Wall.

Family ► *Zingiberaceae.*

Habitat ► Central Himalaya at 1,100–2,500 m, East India and hills of South India.

English ► Spiked Ginger Lily.

Ayurvedic ► Shathi, Shati, Gandhashathi, Gandhapalaashi, Kapuurkachari, Suvrataa, Gandhaarikaa, Gandhavadhuu, Gandhamuulikaa.

Unani ► Kapuurkachari.

Siddha/Tamil ► Poolankizangu, Kichilikizangu.

Folk ► Ban-haldi (Kumaon).

Action ► Rhizome—carminative, spasmolytic, hepatoprotective, anti-inflammatory, antiemetic, antidiarrhoeal, analgesic, expectorant, antiasthmatic, emmenagogue, hypoglycaemic, hypotensive, antimicrobial, anthelmintic, insect-repellent.

The rhizome shows hypotensive effect in dogs at low doses, lowers blood pressure in high doses.

EtOH (50%) extract—anti-inflammatory and hypoglycaemic; gave encouraging results in tropical pulmonary eosinophilia in clinical studies. Alcoholic extract of the plant—vasodilator, mild hypotensive and antiseptic in animals. Essential oil from rhizome—mild tranquilizer in male albino rats; antimicrobial.

Rhizome gave sitosterol and its glucoside, a furanoid diterpene—hedychenone and 7-hydroxyhedychenone. The essential oil contains cineole, gamma-terpinene, limonene, beta-phellandrene, *p*-cymene, linalool and beta-terpineol as major constituents.

The oil inhibits the growth of several fungi. The ethanol (95%) extract showed antibacterial activity. The 50% extract showed antimalarial activity *in vitro* against *Plasmodium berghei* strain.

Dosage ► Rhizome—1–3 g powder. (*API* Vol. I.)

Hedyotis corymbosa (Linn.) Lam.

Synonym ► *Oldenlandia corymbosa* Linn.

Family ► *Rubiaceae.*

Habitat ► A weed in wet, low lands and in cultivated fields.

Ayurvedic ► Kshetraparpata (used in Kerala as Parpataka).

Action ► Purifies blood, improves digestion, stimulates action of liver.

The presence of caffeine and fumaric acid has been reported in *H. corymbosa*.

Iridoidoglucosides have been isolated from *H. diffusa* Willd. The plant is reported to have immunopotentiation activity and has been used in China to treat some tumours. An aqueous extract of the plant yielded a polysaccharide composed of rhamnose, arabinose, xylose, mannose, galactose and glucose.

Hedyotis herbacea Linn., synonym *Oldenlandia herbacea* Roxb. is also used in Kerala as Parpata, Parpataka.

See *Fumaria indica*.

Helianthus annuus Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to America. Cultivated in India.

English ► Sunflower.

Ayurvedic ► Suurajmukhi, Suuryaavarta.

Siddha/Tamil ► Suryakanti.

Action ► Seeds—build up physical endurance and resistance against diseases; a decoction is used in coughs and colds, bronchial, laryngeal and pulmonary affections, whooping cough, also as a febrifuge and diuretic.

The seeds contain a fatty oil (37–48%), rich in polyunsaturated acids (linoleic 70%, oleic 20%). The oil also contains tocopherols (alpha-type 92% of the total) and phytosterol (beta-sitosterol 154 mcg/100 g). In Europe and USA, several hybrids produce oils rich in oleic acid. Sunflower oil is reported to decrease the risk of coronary and arterial diseases.

Extracted oil from dehulled seeds (chlorogenic acid, present in hulls, interferes with lipid metabolism) reduced serum and hepatic cholesterol in healthy women.

The tubers of *Helianthus tuberosus* Linn., a related species, consists mainly of inulin. The dried tubers can be utilized in diabetic products. The tuber concentrate as food diminishes the risk of developing arteriosclerosis. It is advantageous in the diet of patients with gout, chronic renal diseases, and for obesity control.

Helicteres isora Linn.

Family ► *Sterculiaceae.*

Habitat ► Dry forests throughout the country.

English ► East Indian Screw tree.

Ayurvedic ► Aavartani, Aavartphalaa, Aavartaki.

Unani ► Marorphali.

Siddha/Tamil ► Valampiri.

Action ► Pods and bark—antidiarrhoeal, astringent, antibilious. Bark and root—antigalactic, demulcent, expectorant (used in cough and asthma). Leaf—paste used against skin diseases. Pods—anthelmintic. Used in fever due to cold. Seeds—aqueous extract administered in colic and dysentery.

The plant contains a 4-quinolone alkaloid, malatyamine, an antidiarrhoeal principle.

The seeds gave diosgenin. Root gave cytotoxic principles—cucurbitacin B and iso-cucurbitacin B. Leaves yielded as ester tetratriacontanyl—tetratriacontanoate along with tetratriacontanoic acid, tetratriacontanol and sitosterol.

Dosage ► Fruit, bark—3–6 g powder; 50–100 ml decoction. (*CCRAS.*)

Heliotropium indicum Linn.

Family ► *Boraginaceae.*

Habitat ► Throughout India.

English ► Scorpion Tail.

Ayurvedic ► Hastishundi Shrihastini, Vrischikaali.

Siddha/Tamil ► Thaelkodukku.

Action ► Plant—diuretic, astringent, emollient, vulnerary. Used as a local application for ulcers, wounds, sores, gum boils and skin affections. Decoction of leaves is used in urticaria and fevers; that of root in coughs. Flowers—emmenagogue in small doses, abortifacient in large doses. Masticated seeds—stomachic.

Aerial parts of the plant contain alkaloids—indicine (principal base), echinatine, supinine, heleurine, heliotrine, lasiocarpine and lasiocarpine-N-oxide. Aerial parts and root gave an anticancer principle—indicine-N-oxide.

The aqueous and alcohol extracts of the plant possess oxytocic activity. The roots contain significant amounts of estradiol, a sex hormone.

The inflorescences are used by tribals for scorpion bite.

Helleborus niger Linn.

Family ► *Ranunculaceae.*

Habitat ► Native to sub-alpine woods in Southern and Eastern Europe. Grown in Indian gardens.

English ► Black Hellebore, Christmas Rose.

Ayurvedic ► Khuraasaani Kutaki.

H

Unani ► Kharbaq Siyah, Kutaki.

Action ► Digitalis-like action in cardiac disorders, drastic purgative, abortifacient, diuretic, local anaesthetic, narcotic.

The rhizome contains cardiac glycosides; helleborin, helleborein, hellebrin and others based on helleborigenin.

Helleborin has a burning, acrid taste and is narcotic. Helleborein has a sweetish taste and is a highly active cardiac poison. Helleborin and veratrin (steroidal saponins), hellebrin or helleborein (steroid glycoside) are main constituents of the root and leaves. The plant irritates mucous membranes.

A related species, *Helleborus virdis* Linn. (Bear's Foot, Green Hellebore) is known as Kaali Kutaki and Krishnabhedi. The plant contains magnoflorine and corytuberine. The roots and rhizomes gave hellebrin, desglucohellebrin, hellebrigenin, bufatetraenolide, beta-ecdysterone and 5beta-hydroxyecdysterone.

Hemerocallis fulva Linn.

Family ► *Liliaceae.*

Habitat ► The Himalaya, Khasi Hills; cultivated in Indian gardens.

English ► Common Yellow Day-lily, Tawny Day-lily, Orange Day-lily.

Action ► Flower—analgesic, especially in child birth; blood purifier. (Flowers are sold in Chinese food shops as Gum-Tsoy or Gum-Jum.)

Hemerocallin, a neurotoxic principle, has been found in *Hemerocallis* sp. The plant gave amino acid—oxypinnatanine.

Hemidesmus indicus (L.) R. Br.

Synonym ► *Periploca indica* Linn.

Family ► *Asclepiadaceae, Periplocaceae.*

Habitat ► Throughout India; common in Bengal, Maharashtra and extending to Travancore.

English ► Indian Sarsaparilla (white var.). Sarsaparilla root is equated with *Smilax* sp. in Western herbal.

Ayurvedic ► Shveta Saarivaa, Anantmuula, Gopi, Gopaa, Gopakanyaa, Gopavalli, Gopasutaa, Krishodari, Sphotaa, Utpalsaarivaa, Kapuuri, Dugdhgarbhaa.

Unani ► Ushbaa Hindi.

Siddha/Tamil ► Nannaari, Suganthipala.

Action ► Blood purifier, antisyphilitic, antileucorrhoeic, galactogenic, antidiarrhoeal, antirheumatic, febrifuge, alterative. Roots used against gonorrhoea, leucoderma, bleeding piles, jaundice and dysentery.

Key application ► *Smilax* sp.—in skin diseases and urinary infections. (*German Commission E* included *Smilax* sp. among unapproved herbs.)

Hemidesmus indicus does not contain the same saponins or other principal constituents which are found in sarsaparilla. (Tyler's *Honest Herbal.*)

The root contains coumarino-lignoids, hemidesmine, hemidesmin-1, 2. The stem contains pregnane glycosides, hemidine, hemidescine, emidine and indicine, a triterpene lactone, a lupanone, besides lupeol acetate, sitosterol and hexadecanoic acid and several hydroxy- methoxybenzaldehydes.

Aqueous extract of the root is bacteriostatic against *Mycobacterium leprae*.

Dosage ► Root—20–30 g for decoction. (*API* Vol. I.)

Hemidictyum ceterach L.

Synonym ► *Ceterach officinarum* Willd.
Asplenium ceterach L.

Family ► *Athyriaceae, Polypodiaceae.*

Habitat ► Western Himalaya, from Kashmir to Garhwal, up to 3,000 m.

Action ► Fern—diuretic, astringent; used for diseases of the urinary tract, infirmities of spleen, also for treating jaundice.

The plant contains caffeic acid, neohesperidin, kaempferol-3, 7-diglucoside, chlorogenic acid and quercetol-3-glucoside. The leaves gave methyl esters of the acids—myristic, palmitic, palmitoleic, stearic, oleic, linoleic and arachidic. Pyrocatechol, tannins, flavonoids and amino acids were also present.

Hemionites arifolia (Burm. f) Moore.

Family ► *Adiantaceae.*

Habitat ► Plains and mountains of South India up to 1,200., and in West Bengal, Bihar and Orissa.

English ► Mule Fern.

Folk ► Raamabaanam (Andhra Pradesh), Chakuliya (Bengal).

Action ► Fonds—antibacterial, used in burns and as febrifuge.

Heracleum candicans Wall. ex DC.

Synonym ► *H. nepalense* D. Don.
H. lanatum Michx.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Chamba, Kulu, Jammu & Kashmir, Bushahr, Garhwal and Kumaon Hills.

English ► Cowparsnip.

Folk ► Kaindal (Kashmir), Gandhraayana (Garhwal).

Action ► Fruit—stimulant, nervine tonic, spasmolytic. Heraclenin (active principle)—hypoprothrombinaemic.

Essential oil from the fruits is moderately antimicrobial.

Furanocoumarins present in the whole fruit and leaves are psoralen, xanthotoxin and bergapten. Roots also contain furanocoumarins.

The fruits of *H. concanense* Dalz. contain a coumarin which is effective against dermatophytosis. The fruits of *H. regins* Wall. ex DC. are used for cough and bronchitis, also for urinary concretions in Siddha medicine. *H. thomsoni* C. B. Clarke (Kashmir and Himachal Pradesh) also contains a coumarin; the fruit showed nonspecific spasmolytic activity equipotent to papaverine.

Herniaria glabra Linn.

Family ▶ *Illecebraceae.*

Habitat ▶ Throughout Europe. Introduced into Indian gardens.

English ▶ Rupture-Wort.

Action ▶ Plant—astringent, diuretic, antimicrobial, anticatarrhal. An infusion is used principally for bladder complaints for ruptures.

The plant gave a flavonic glycoside, rutoside; coumarins, herniarin and umbelliferone, and saponins.

A related species, *H. hirsuta* L. (Himalaya, from Kashmir to Kumaon up to 3,000 m) gave umbelliferone, scopoletin and herniarin.

Heterophragma roxburghii DC.

Synonym ▶ *H. quadriloculare* (Roxb.) D. Schum.

Family ▶ *Bignoniaceae.*

Habitat ▶ Gujarat, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu.

Ayurvedic ▶ Waarasa.

Siddha/Tamil ▶ Barokalagoru.

Folk ▶ Pullunga, Paatang (Maharashtra).

Action ▶ Tar extracted from wood—used in skin diseases. Leaf juice—applied externally on toe sores and in chilblain.

The flowers gave hentriacontane and allantoin; the leaves contain ursolic acid and sitosterol. The seeds contain a saponin (rhamnoside), lupeol, beta-sitosterol, stigmasterol and cubulin. The essential oil from flowers exhibits antimicrobial activity.

Hibiscus abelmoschus Linn.

Synonym ▶ *Abelmoschus moschatus* Medic.

Family ▶ *Malvaceae.*

Habitat ▶ Throughout the warmer parts and hilly regions of India; also cultivated.

English ▶ Musk Seed, Muskmallow, Ambette Seed.

Ayurvedic ▶ Lataakasturi, Lataakasturikaa, Kattaphala, Katuka.

Unani ▶ Mushkdaanaa.

Siddha/Tamil ▶ Kasturi-vendai.

Action ▶ Seeds—diuretic, antispasmodic, stomachic, nervine (nervous debility, hysteria and other nervous disorders). Used externally for skin diseases and itch. Mucilage made

from the root and leaves is prescribed in venereal diseases, urinary discharges and painful micturition. Seeds, steeped in water, are used for asthma, cold, flu.

Fatty oil of seeds contains phospholipids—alpha cephalin, phosphatidylserine and its plasmalogen and phosphatidylcholine plasmalogen. Absolute contains farnesol and ambrettolic acid lactones.

The seeds contain chiefly 2-*trans*, 6-*trans*-farnesyl acetate, 2-*cis*, 6-*trans* farnesyl acetate and ambrettolide. The leaves contain beta-sitosterol and its beta-D-glucoside.

Dosage ► Seed—2–4 g powder. (*API* Vol. IV.)

Hibiscus cannabinus Linn.

Family ► *Malvaceae.*

Habitat ► Native to tropical America and Africa; cultivated in West Bengal, Andhra Pradesh, Assam, Uttar Pradesh, Madhya Pradesh, Tamil Nadu, Bihar and Punjab.

English ► Bimlipatam Jute, Kenaf, Mesta, Deccan Hemp.

Siddha/Tamil ► Pulichhai, Pulimanji, Kasini.

Folk ► Patsan, Pitwaa. Ambaadi (Maharashtra).

Action ► Seed—nervine tonic, analgesic. Leaf—purgative. The juice of flowers, mixed with sugar and black pepper, is given for biliousness.

The leaves contain flavonoids, including rutin and isoquercitrin; kaempferol; polyphenols. The flowers gave myricetin glucoside; the root contains polyphenols, also proanthocyanidins. The seeds gave phosphonolipids.

Hibiscus mutabilis Linn.

Family ► *Malvaceae.*

Habitat ► Native to China; planted in the hedges of gardens.

English ► Cotton-Rose, Chinese-Rose, Confederate Rose.

Ayurvedic ► Sthala-Padam, Sthal-Kamal.

Siddha/Tamil ► Irratai-vellaichembarattam, Sembarattai.

Action ► Flower—used in pectoral and pulmonary affections. Leaf and flower—expectorant, bechic, anodyne. Used in menorrhagia, dysuria, swellings, fistulae, wounds and burns.

The flowers contain quercetin, kaempferol, betulinic acid, hexyl stearate, tetratriacontanol, nonacosane, stigmasta-3, 7-dione, stigmasta-4-ene-one and beta-sitosterol. Flowers collected in the morning gave no anthocyanin; maximum anthocyanin is found in the afternoon.

Hibiscus rosa-sinensis Linn.

Family ► *Malvaceae.*

Habitat ► Native of China; grown in gardens throughout India.

English ► Rose-of-China, Shoe-flower, Chinese Hibiscus.

Ayurvedic ► Japaa, Javaa, Odrapushpa, Rudrapushpa, Arunaa.

Unani ► Gul-e-Gurhal.

Siddha/Tamil ► Semparuthi.

Action ► Flower—used in impotency, bronchial catarrh. Flower and bark—emmenagogue. Leaf—stimulates expulsion of placenta after childbirth; laxative, anodyne. Flower and root—used in menorrhagia.

H

The plant contains the cyclopropanoids, methyl sterculate, methyl-2-hydroxysterculate, 2-hydroxysterculate, malvalate and beta-sitosterol.

The major anthocyanin in the flower is cyanidin 3-sophoroside. The flower nectar is rich in amino acids, mainly aspartic acid and asparagin. During pollination, the amino acid concentration increases substantially.

Flower powder exhibited anti-inflammatory activity in male albino rats with carrageenan-induced rat paw oedema. The aqueous extract of the plant showed antitumour activity against sarcoma 180 ascites.

An aqueous extract of flowers reduced the duration of oestrus cycle in experimental albino rabbits. The alcoholic extract of flowers showed anti-implantation activity. The benzene extract of flowers, on oral administration, terminated pregnancy in experimental animals.

Flower buds are used in the treatment of vaginal and uterine discharges.

Oral administration of flower extract to rats affected spermatogenesis and endocrine function of testis.

In diabetic patients, a flower bud is given daily up to 10 days or until the level of blood sugar is reduced to tolerable limits.

The white-flowered var. of Japan (cultivated all over India in garden) is equated with *Hibiscus syriacus* Linn. (Rose of Sharon, Shrubby Althaea). The white flower is an oriental drug used as demulcent and antidiarrhoeal. The bud yields mucilage which consists mainly of partially acetylated acidic polysaccharides. The aqueous extract of the petals causes vasorelaxation of the isolated rat arota via both endothelium-dependent and -independent mechanisms. The petals contain anthocyanin pigments.

The cortex and bark exhibit antifungal acitivity.

The bark gave canthin-6-one and a fatty acid fraction consisting of lauric, myristic and palmitic acids.

Dosage ► Flower—10–20 g paste. (*CCRAS*.)

Hibiscus sabdariffa Linn.

Family ► *Malvaceae.*

Habitat ► Native to the West Indies; now cultivated in Uttar Pradesh, Andhra Pradesh, West Bengal, Bihar, Punjab, Assam and Tamil Nadu.

English ► Roselle, Jamaican Sorrel, Natal Sorrel, Red Sorrel.

Ayurvedic ► Ambashtthaki.

Siddha/Tamil ► Sivappu Kashmakki, Pulichai-keerai, Gogu, Seemai Kaseru.

Folk ► Laal-ambaadi, Patavaa, Patsan.

Action ► Digestive, choleretic, antibilious, laxative, diuretic, hypotensive, antiscorbutic. Used as a cardiac and nervine tonic for disorders of circulation, also for calcified arteries.

Key application ► Flowers—used for loss of appetite, for colds, catarrhs of the upper respiratory tract and stomach, for disorders of circulation. (Included among unapproved herbs by *German Commission E.*)

The seeds contain sterols, including 3.2% ergosterol; leaves contain sitosterol-beta-D-galactoside. Flowers contain myricetin, kaempferol and quercetin, but did not contain free mutagenic flavonol aglycons.

The aqueous extract of flower buds has been reported to decrease blood pressure, cause relaxation of rat uterus. Succulent sepals and leaves—hypotensive, antimicrobial and anthelmintic.

Oil and unsapanofiable matter—antibacterial, antifungal.

Dosage ► Root—5–10 g. (*API* Vol. III.)

Hibiscus surattensis Linn.

Family ► *Malvaceae.*

Habitat ► Throughout the warmer parts of India.

Ayurvedic ► Ran Bhindi.

Folk ► Kishli-Keerai (Tamil Nadu).

Action ► Flower—emollient, pectoral. Stem and leaf—used in urethritis and venereal diseases.

Petals (yellow part) gave gossypitrin and gossypetin; the purple part gave cyanidin, delphinidin and pelargonidin.

Hippophae rhamnoides Linn.

Family ► *Elaeagnaceae.*

Habitat ► North-west Himalayas at 2,350–5,000 m.

English ► Seabuckthorn, Sand Thorn.

Folk ► Dhurchuk, Chumaa, Tarwaa (Uttar Pradesh), Sirmaa (Punjab, Ladakh).

Action ► Fruit—astringent, antidiarrhoeal, stomachic, antitussive, antihaemorrhagic.

Sea Buckthorn preparations are used internally for stomach ulcer, duodenal ulcer and other illnesses of the alimentary organs; externally in cases of burns, bedsores and other skin complications induced by the treatment with X-rays and other radiations.

The berries contain polyphenols, 3,4-dihydroxy benzoic acid and *p*-coumaric acid. They are an important source of vitamins for people living in cold, long winter regions; contain high concentration of vitamin A (carotene 30–40 mg), B1, B2, B6, C (50–600 mg) and E (160 mg/100 g).

The plant is an effective antioxidant and shows protective effect on smooth muscles of rabbits *in vitro*. The methanolic extract of the berry showed scavenging activity on chemically generated superoxide radicals.

The leaves contain flavonoids, isorhamnetin and astragalin; the bark gave serotonin.

Hiptage benghalensis Kurz.

Synonym ► *H. madablota* Gaertn.

Family ► *Malpighiaceae.*

Habitat ► Throughout the warmer parts of Maharashtra, Konkan, Karnataka and other parts of India.

Ayurvedic ► Atimukta, Atimuktaka, Maadhavi, Vaasanti, Pundrika, Mandaka, Vimukta, Kaamuka.

Siddha/Tamil ► Madhavi, Vasandagala-malligai.

Action ► Kernel of seeds is prescribed for reducing abdominal girth (obesity). Leaves—used in chronic rheumatism, asthma and skin diseases. Bark—used in bronchial asthma.

The stem and its bark contain friedelin, *epi*-friedelinol, octacosanol, alpha-amyrin, beta-sitosterol and its beta-D-glucoside. The root bark gave a nitrogenous glucoside, hiptagin, identical with endecaphyllin and a glucosyl xanthone, mangiferin.

Dosage ► Fruit, seed, root—powder 3–5 g; paste 5–10 g. (*CCRAS.*)

Holarrhena antidysenterica (Linn.) Wall.

Synonym ► *H. pubescens* (Buch.-Ham.) Wall. ex G. Don.

Family ► *Apocynaceae.*

Habitat ► The tropical Himalayas, going up to an altitude of 1,100 m. Also found throughout many forests of India, in Travancore, Assam and Uttar Pradesh.

English ► Easter tree, Ivory tree, Tellicherry Bark.

Ayurvedic ► Kutaja, Girimallikaa, Kaalinga, Kalingaka, Indravriksha, Shakra, Vatsa, Vatsaka, Shakraahvya. Indrayava, Indrabija, Vatsabija (seed). Kurchi (bark).

Unani ► Inderjo talkh, Teewaaj-e-Khataai.

Siddha/Tamil ► Kudasappaalai-pattai, -vidai (bark, seed).

Action ► Root and bark—used in amoebic dysentery. Bark—astringent, anthelmintic, amoebicidal, diuretic. Used in colic, dyspepsia, piles, diseases of the skin and spleen. Seed—antibilious. Used for promoting conception, also for toning up vaginal tissues after delivery.

The bark contains the alkaloids, regholarrhenine-A, -B, -C, -D, -E and -F; pubescine, norholadiene, pubescimine, kurchinin, kurchinine, kurchinidine, holarrifine, holadiene, kurchilidine, kurchamide, kurcholessine, kurchessine, conessine, cones-

simine and isoconessimine, and the steroidal compounds kurchinicin and holadyson.

The alkaloid conessine is used as a therapeutic drug for the treatment of dysentery and helminthic disorders. Conessine and conimine inhibited the growth of *Shigella sonnei*, *S. flexneri* and *Salmonella enteritidis* strains *in vitro*. In chronic amoebiasis, Bi-iodide compound of total alkaloids, given orally, compare favourably with emetine Bi-iodide.

The plant possesses potent immunostimulant property.

The Kurchi seeds are sold as a substitute for *Strophanthus* sp. seeds in Indian market. (Seeds of *Strophanthus* sp. contain a toxic glucoside, strophanthin, and are poisonous.)

Dosage ► Stem bark—20–30 g for decoction. (*API* Vol. I); seed—3–6 g powder; 20–30 g for decoction. (*API* Vol. III.)

Holoptelea integrifolia Planch.

Family ► *Ulmaceae.*

Habitat ► Throughout greater parts of India, also grown in gardens.

Ayurvedic ► Chirbilva, Putika, Prakirya.

Siddha/Tamil ► Avil thol, Ayil pattai (bark)

Action ► Bark—internally and externally used in rheumatism. Stem bark paste—in scabies. Seeds—used topically on ringworm.

The Ayurvedic Pharmacopoeia of India recommends dried fruits in polyuria and other urinary disorders.

The stem bark contains the triterpenoidal fatty acid esters, holoptelin-A (*epi*-friedelinol palmitate) and holoptelin-B (*epi*-friedelinol stearate), friedelin and *epi*-friedelinol.

The powdered bark exhibited lipolytic action and mobilized fat from adipose tissues in rats and consequently helped in the reduction of obesity.

Dosage ► Dried fruit—1–3 g. (*API* Vol. III.)

Holostemma annularis (Roxb.) K. Schum.

Synonym ► *H. ada-kodien* Schult.
H. rheedii Wall.
Asclepias annularis Roxb.

Family ► *Asclepiadaceae.*

Habitat ► Tropical Himalayas and Western Peninsula. Cultivated in Dharmapuri district of Tamil Nadu.

Ayurvedic ► Ark-pushpi.

Siddha/Tamil ► Palay-keerai.

Action ► Roots—used in orchitis, spermatorrhoea, also as laxative. Roots are used as Jivanti in Kerala (See also *Leptadenia reticulata.*)

The tubers contain protein (5.5–10%). It gave alpha-amyrin, lupeol and beta-sitosterol. Aspartic acid, glycine, serine, threonine and valine were detected chromatographically.

The bark gave alpha-amyrin, lupeol and beta-sitosterol.

Homonoia riparia Lour.

Synonym ► *Adelia neriifolia* Heyne ex Roth.

Family ► *Euphorbiaceae.*

Habitat ► Eastern, Central and Peninsular India, up to 700 m.

Ayurvedic ► Paashaana-bheda (substitute), Kshudra Paashaana-bheda.

Siddha/Tamil ► Kattu Alari.

Action ► Root—diuretic, spasmolytic, antilithic. Used for urinary discharges. Leaf and stem—depurative. Leaf and fruit—used in skin diseases.

The roots gave alpha-spinasteryl acetate. The fatty acid from the fat of roots gave myristic, palmitic, stearic and oleic acids.

Hordeum vulgare Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated as food crop in Uttar Pradesh, West Bengal, Bihar, Madhya Pradesh, Rajasthan, Haryana, Punjab, Himachal Pradesh and Jammu and Kashmir.

English ► Barley

Ayurvedic ► Yava, Hayeshtha, Hayapriya, Shuka-dhaanya, Tikshnashuka.

Unani ► Barley, Jao Shaeer.

Siddha ► Yavam. Saambaluppu (ash).

Action ► Barley—nutritive and demulcent during convalescence and in cases of bowel inflammation and diarrhoea. Protects immune system.

The Ayurvedic Pharmacopoeia of India recommends barley in urinary disorders, muscular rigidity, chronic sinusitis, cough, asthma, lipid disorder and obesity.

Juice of young barley leaves—7 times richer in vitamin C than oranges, 5 times richer in iron than spinach, 25 times richer in potassium than wheat; high in SOD (superoxide dismutase), an enzyme that slows ageing of cells.

The nutritional quality of the barley depends on beta-glucan fraction of the grain. Beta-glucan-enriched fraction produced cholesterol-lowering effect in hamsters.

Naked barley extracts have been found to selectively inhibit cyclohexanase activity and may be useful as a therapeutic drug for treating thrombosis and atherosclerosis.

Ethanol extract of young green leaves exhibits antioxidant activity attributed to a flavonoid, 2′′-O-glucosylisovitexin. It also exhibits anti-inflammatory and antiallergic activities. The leaves contain an indole alkaloid, gramine, which exhibits antibacterial properties.

Dosage ► Dried fruit—100–200 g. (*API* Vol. II); dried plant—10–20 g. (*API* Vol. IV.)

Hovenia dulcis Thunb.

Synonym ► *H. acerba* Lindl.

Family ► *Rhamnaceae.*

Habitat ► Native to China. Now cultivated in Kumaon, Sikkim and West Bengal.

English ► Japanese Raisin tree, Coral tree.

Folk ► Sikkaa.

Action ► Fruit—diuretic; relieves intoxication due to wine.

The leaves and root bark gave triterpene saponins. Root bark also gave peptide alkaloids.

The fruit extract contains potassium nitrate and potassium malate and is strongly diuretic. The seeds contain beta-carboline alkaloid, perlolyrine. A toothpaste, containing extracts of the fruits and seeds as one of the ingredients, has been patented for controlling dental caries (in Japan).

Hugonia mystax Linn.

Family ► *Linaceae.*

Habitat ► Konkan and North Kanara, throughout dry forests of Tamil Nadu.

Folk ► Kaakibeeraa, Kansamaara.

Siddha/Tamil ► Agori. Motirakkanni.

Action ► Root—anti-inflammatory, febrifuge; disperses swellings.

Humulus lupulus Linn.

Family ► *Cannabinaceae.*

Habitat ► Native to Europe and Asia. Conditions for its successful cultivation are reported to exist in Kashmir and parts of Himachal Pradesh.

English ► Hops.

Unani ► Hashish-ut-Dinaar.

Action ► Flowers—sedative, hypnotic, nervine tonic, diuretic, spasmolytic on smooth muscle, analgesic, astringent. Used for nervous diseases, intestinal cramps, menopause, insomnia, neuralgia and nervous diarrhoea. Also as a tonic in stomach and liver affections. As a blood cleanser, the root is used like sarsaparilla.

Key application ► In mood disturbances, such as restlessness and anxiety, sleep disturbances. (*German Commission E. ESCOP.*)

The British Herbal Compendium and *The British Herbal Pharmacopoeia* reported herb's action as sedative, soporific, spasmolytic and aromatic bitter, and indicated its use for excitability, restlessness, disorders of sleep and lack of appetite.

Hop cones consist of the whole dried female inflorescences of *Humulus lupulus*.

Hop contains bitter principles—lupulin containing humulon, lupulon and valerianic acid; volatile oil (0.3–1.0%) including humulene; flavonoids including xanthohumole; polyphenolic tannins, asparagin, oestrogenic substances.

Bitter principles stimulate the digestive system. Valerianic acid is sedative. The resin components, lupulon and humulon are antiseptic against Gram-positive bacteria. Asparagin is diuretic. Research suggested that the anti-

spasmodic effect is stronger than the sedative, and hops also possess antihistaminic and anti-oxytocic properties. (Cases of amenorrhoea and dysmenorrhoea are treated with hops.)

Hop extracts exert different effects on CNS in mice. They show hypothermic, hypnotic, sedative, muscle relaxing and spontaneous locomotor activities, besides potentiating pentobarbital anaesthesia in mice.

Humulone inhibited induced inflammation in mice.

The dried strobila containing humulone and lupulone showed antidiabetic activity in experimental rats.

Hop mash or extract is used in the preparation of toothpaste for inhibiting Gram-positive bacteria and in hair preparations for preventing dandruff formation. It is also used in skin-lightening creams.

Hura crepitans Linn.

Family ► *Euphorbiaceae.*

Habitat ► Native to tropical America; introduced into India.

English ► Sandbox tree, Monkey Dinner-bell.

Siddha/Tamil ► Mullarasanam.

Action ► Seed, bark and fresh latex—emetocathartic, antileprotic. Seed—insecticidal, piscidal.

In South America, a poultice made from the latex is used for treating cutaneous leishmaniasis. Highly irritant and tumour-promoting deterpene esters (DTC) have been detected in the latex. Latex gave the triterpenes, 24-methylene cycloartanol, cycloartanol and butyrospermol. Sap of the plant gave a diterpene hexaol ester, huratoxin, and a glycolipoprotein, crepitin.

Hydnocarpus kurzii (King) Warb.

Synonym ► *H. heterophylla* auct. non-Bl.
Taractogenos Kurzii King.

Family ► *Flacourtiaceae.*

Habitat ► Assam and Tripura.

English ► Chalmogra.

Ayurvedic ► Tuvaraka (related species, substitute for *H. laurifolia.*)

Unani ► Chaalmograa, Tukhm-e-Biranj Mograa.

Siddha/Tamil ► Niradi-muttu.

Action ► Antileprotic, dermatic, febrifuge, sedative. Used parenterally for leprosy; also for psoriasis, eczema and dermatitis.

The plant is a source of chaulmoogra oil (Oleum Chaulmoograe which contains hydnocarpic, chaulmoogric, gorlic, oleic, palmitic acids and lower homologues of hydnocarpic acid. The oil mixed with neem oil or oil of *Psoralea corylifolia* is used in leprosy.

In mice, intraperitoneal and subcutaneous administration of chaulmoogra fatty acids demonstrated antimicrobial activity against *Mycobacterium leprae*. (*PDR.*)

Hydnocarpus laurifolia (Dennst.) Sleumer.

Synonym ► *H. wightiana* Blume.

Family ▶ *Flacourtiaceae.*

Habitat ▶ Western Ghats.

English ▶ Soorty Oil tree.

Ayurvedic ▶ Tuvaraka, Katu-Kapittha, Kushtavairi, Garudaphala, Chaalmograa.

Unani ▶ Chaalmograa, Tukhm-e-Biranj Mograa.

Siddha/Tamil ▶ Maravattai, Niradi-muttu.

Action ▶ Seed oil—antileprotic, anti-inflammatory, antirheumatic.

The seed oil gave chemical constituents similar to *Hydnocarpus kuzii*, and contain the flavonolignan, hydnowightin, hydnocarpin and neohydnocarpin.

Hydnocarpin showed good anti-inflammatory and anti-neoplastic activity in mice, *in vivo*. Cytotoxicity against the growth of murine and human tissue cultured cells was also observed.

The stem bark and leaves contain triterpenes, acelylbetulinic, betulinic, ursolic and acetylursolic acids.

Dosage ▶ Seed—3–5 g powder; oil—5–10 drops. (*CCRAS.*)

Hydrocotyle javanica Thunb.

Family ▶ *Umbelliferae; Apiaceae.*

Habitat ▶ The Himalayas, Khasi Hills and Western Ghats.

Ayurvedic ▶ Manduukaparni (related species).

Folk ▶ Brahma-manduuki (Sikkim).

Action ▶ Used as a substitute for *Centella asiatica*, as a blood purifier (in cutaneous diseases); for indigestion, dysentery and nervousness.

The plant is used for treating leucoderma.

Hydrocotyle rotundifolia Roxb. (throughout India, up to 2,350 m) is also equated with Manduukaparni.

H

Hydrolea zeylanica Vahl.

Family ▶ *Hydrophyllaceae.*

Habitat ▶ Throughout India, in moist and swampy places.

Ayurvedic ▶ Wrongly equated with Laangali. (Laangali is equated with *Gloriosa superba* Linn.) Known as Ish-languulia (West Bengal).

Action ▶ Leaves and paste—used for callous ulcers. Plant—antiprotozoal.

Hygrophila auriculata (K. Schum.) Heine.

Synonym ▶ *H. schulli* (Ham.) MR & SM Almeida.
H. spinosa T. anders.
Asteracantha longifolia (L.) Nees.

Family ▶ *Acanthaceae.*

Habitat ▶ Throughout India along the banks of fresh or stagnant water ditches and swampy grounds, mixed with marshy grasses and sedges.

Ayurvedic ▶ Kokilaaksha, Kokilaakshi, Ikshuraka, Ikshura, Kshuraka, Bikshu, Kaakekshu.

Unani ► Taalmakhaanaa.

Siddha/Tamil ► Neermulli.

Action ► Leaves, roots and seeds—diuretic; used for diseases of the urinogenital tract, spermatorrhoea. Seeds promote sexual vigour, arrest abortion and cure diseases due to vitiated blood. Also used for arthritis and oedema.

The seeds contain large amounts of tenacious mucilage and potassium salts, which may be responsible for the diuretic property of seeds. The seeds also contain linoleic acid (71%), besides diastase, lipase and protease.

EtOH (50%) extract of the plant is spasmolytic and hypotensive.

The chloroform soluble fraction of ethanolic extract of aerial parts exhibited promising hepatoprotective activity in albino rats.

The plant contains lupeol, stigmasterol and hydrocarbons.

Dosage ► Seed—3–6 g powder; ash—1–3 g. (*CCRAS.*)

Hymenodictyon excelsum Wall.

Synonym ► *H. orixense* (Roxb) Mobb.

Family ► *Rubiaceae.*

Habitat ► Central India and Western Peninsula.

Ayurvedic ► Bhramar-chhalikaa, Ugragandhaa (a confusing synonym). Bhringa-vrksha (provisional synonym).

Siddha/Tamil ► Sagappu, Vellei Kadambu, Peranjoli.

Folk ► Bhaulan, Bhramarchhali, Bhuurkunda.

Action ► Bark—astringent, febrifuge, antiperiodic (especially for tertian ague).

The stem bark contains scopoletin and its apioglucoside, hymexelsin (yield 0.12%). The presence of glucose, fructose, galactose and several amino acids, alanine, arginine, cystine, glycine, leucine; besides fatty acids, beta-sitosterol and stigmasterol is also reported from the bark.

Roots contain several quinones.

Hyoscyamus muticus Linn.

Family ► *Solanaceae.*

Habitat ► North-western Himalayas. Cultivated on limited scale in North Indian plains.

English ► Egyptian Henbane.

Ayurvedic ► Paarsika-yavaani (related species), Turushkaa.

Unani ► Ajwaayin Khuraasaani, Shuukraan, Tukhm-bang.

Folk ► Vajra-bhang.

Action ► Sedative.

The leaves and flowering tops contain higher concentration of tropane alkaloids than other species of Hyoscyamus, used as a source of hyoscine.

Hyoscyamus niger Linn.

Family ► *Solanaceae.*

Habitat ► Native to Europe and Asia. Occurs in the temperate Himalayas from Kashmir to Garhwal.

English ► Indian Henbane, Black Henbane.

Ayurvedic ► Paarsika-yavaani, Yavaani, Madkaarini, Turushkaa, Khuraashaanikaa, Khuraasaani Ajwaayin.

Unani ► Barz-ul-Banj, Khuraasaani Ajwaayin.

Siddha/Tamil ► Paarseekayavani, Khurasani Omam.

Action ► Sedative. Narcotic drug. Used for convulsions. Action similar to Belladonna.

Key application ► In spasms of gastrointestinal tract. (*German Commission E, The British Herbal Pharmacopoeia.*)

The leaves and flowering tops contain tropane alkaloids, 0.045–00.14%, the principal ones being hyoscyamine and hyoscine. The alkaloids are parasympatholytic, with similar actions to Belladonna, although with less cerebral excitement.

The seeds show inhibitory activity against digestive enzyme, lipase *in vitro.*

Contraindicated in tachycardias, prostatic hyperplasia, narrow-angle glaucoma, acute pulmonary oedema, stenosis of gastrointestinal tract, maga colon.

Dosage ► Seed—3–5 g powder. (*CCRAS.*)

Hypecoum leptocarpum Hook. f. & Thoms.

Family ► *Papaveraceae.*

Habitat ► Mediterranean region and temperate Asia. (Allied species: *H. pendulum* Linn. and *H. procumbens* Linn., found in Peshavar, Multan, Waziristan and Baluchistan). Occurs in Sikkim.

Folk ► Zirgulaki, Waziri.

Action ► Used in stomachache. Juice of the plant has the same effect as opium. Leaves diaphoretic. Plant—narcotic.

The whole plant contains protopine (0.19) as the major alkaloid.

Hypericum perforatum Linn.

Family ► *Hypericaceae.*

Habitat ► Temperate Western Himalayas from Kashmir to Shimla at 2,000–3,000 m.

English ► Common St. John's wort.

Unani ► Heufaariqoon, Bassant, Balsaan.

Action ► Antidepressant, sedative, relaxing nervine, anti-inflammatory. Used in anxiety, stress, depression, menopausal nervousness, menstrual cramps, neuralgia and rheumatism.

Key application ► Psychovegetative disturbances, depressive moods, anxiety and or nervous unrest. Externally, oil preparation for treatment and post-therapy of acute and contused injuries, myalgia

and first degree burns. (*German Commission E, ESCOP, British Herbal Pharmocopoeia.*)

The herb contains hypericin and pseudohypericin (0.0095 to 0.466% in the leaves and as much as 0.24% in the flowers), rutin, quercetin, hyperoside, methylhesperidin, caffeic, chlorogenic, *p*-coumaric, ferulic, *p*-hydroxybenzoic and vanillic acids.

Plant's standardized extract (0.3% hypericin) shows antidepressant activity by inhibiting MAO.

A biflavonoid, amentoflavone, isolated from the plant, exhibited anti-inflammatory and antiulcerogenic activity.

Alcoholic extract of the plant shows *in vivo* hepatoprotective activity in rodents.

The oily extract of the flowers have been found effective in wound-healing due to the antibiotically active acylphlorogucinol, hyperforin.

The aerial parts show significant antibacterial activity against several Gram-positive and Gram-negative bacteria.

A lyophilized infusion from the aerial parts exhibited antiviral activity and inhibited reproduction of different strains of influenza virus types A and B both *in vivo* and *in vitro*.

The whole herb is effective against many viral infections.

Hyptis suaveolens (Linn.) Poit.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Native to tropical America. Distributed throughout India.

Ayurvedic ▶ Tumbaaka (provisional synonym).

Folk ▶ Gangaa Tulasi, Vilaayati Tulasi, Bhunsari.

Action ▶ Carminative, antispasmodic, antisoporific, antirheumatic, anticephalalgic, lactagogue. Used in catarrhal and uterine affections, parasitical cutaneous diseases, epistaxis.

The plant gave lupeol, lupeol acetate and friedelin, leaves and flowers gave campesterol and fucosterol; roots contained beta-sitosterol, oleanolic and alpha-peltoboykinolic acids.

The plant gave an essential oil containing *l*-sabinene. *l*-limonene and azulenic sesquiterpenes as major constituents. The oil inhibits the growth of Gram-positive and Gram-negative bacteria, particularly, *Staphylococcus aureus*; also exhibits fungitoxicity.

Alcoholic extract (50%) of the whole plant exhibited hypoglycaemic and anticancer activity.

Hyssopus officinalis Linn.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Native to Europe and temperate Asia. Occurs in West Himalyas from Kashmir to Kumaon.

English ▶ Hyssop.

Ayurvedic ▶ Dayaa-kunji. (*Nepeta longibractea* is also equated with Zuufaa, Dayaa-kunji.)

Unani ▶ Zuufaa, Zuufaa Yaabis.

Folk ▶ Diyaanku (Laddakh).

Action ► Stimulant, carminative, sedative, antispasmodic, diuretic, pectoral. Used for bronchitis, coughs and colds. Induces heavy sweating in fevers, increases blood pressure. Emmenagogue. Used externally for bruises, discoloured contusions and cuts.

Key application ► As expectorant. (*The British Herbal Pharmacopoeia.*)

Hyssop contains terpenoids, including marrubiin; a volatile oil consisting mainly of camphor, pinocamphone and beta-pinene; flavonoids, glucosides, tannins and resin. Marrubiin is a strong expectorant. The plant also contains ursolic acid, an anti-inflammatory principle. The alcoholic extract of the aerial parts at flowering yields an active antioxidant compound, rosmanol-9-ethyl ether. Its activity is much greater than butylated hydroxytoluene. The extract of the plant showed weak hepatoprotective activity against CCl4-induced toxicity in albino mice.

Pinocamphone and isopinocamphone are toxic constituents of the essential oil. Wild plants from Kumaon (Uttaranchal) shows presence of very small amounts of pinocamphone (0.61%) in essential oil, as compared to Himalayan hyssop (38.44%) and cultivated North American hyssop (42.66%). The essential oil can induce epileptic seizures.

I

Iberis amara Linn.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Native to Europe; cultivated in gardens. Reported to occur in Chamba.

English ► Rocket Candytuft, Clown's Mustard.

Action ► Used for gout, rheumatism, also for bronchitis and asthma; as a tonic in enlargement of heart to allay excited action of the heart.

The seeds contain a mustard oil and a glycoside, glucoiberin. The plant contains sulphur-containing glucosinolates; also contains bitter and toxic tetracycloterpenoids, cucurbitacin E and I.

The seed extract exhibited cytotoxicity against renal and brain tumours and melanoma cell lines. The activity may be attributed to the presence of cucurbitacins E and I.

Ichnocarpus frutescens R. Br.

Family ► *Apocynaceae.*

Habitat ► Uttar Pradesh, Madhya Pradesh, Bihar, Assam and the Sunderbans.

English ► Black Creeper.

Ayurvedic ► Gopavalli, Krishna Saarivaa (var.), Krishna-muuli, Shyaamalataa.

Siddha/Tamil ► Karunannari, Makalikilanzhu.

Folk ► Kaalisar, Karantaa.

Action ► Root—demulcent, diuretic, alterative, diaphoretic; used in fevers, dyspepsia and cutaneous affections. The roots of the plant are used as a substitute for Indian sarsaparilla and are often mixed with the roots of *Hemidesmus indicus* (their therapeutic properties for use as sarsaparilla have bot been established).

The root gave 2-hydroxy-4-methoxybenzaldehyde.

Alkaloids and flavonoids were present in the roots but not in the leaves and fruits. Saponins were absent in these parts. The whole plant gave *n*-butyl sorboside, kaempferol and its glucoside.

Ilex aquifolium Linn.

Family ► *Aquifolilaceae.*

Habitat ► Native to Europe; grown occasionally in gardens at hill stations.

English ► English Holly, Common Holly.

Action ► Leaves—diaphoretic, febrifuge. Used in catarrh, pleurisy, intermittent fever, smallpox and rheumatism. Also in jaundice. Berries—violently emetic and purgative; employed in dropsy. Powdered berries are used as astringent to check bleeding.

(Berries possess totally different qualities as compared to leaves.)

The plant contains ilicin (a bitter principle), ilexanthin, theobromine (only in the leaf) and caffeic acid. Alkaloid theobromine is used for asthma. In Greece, boiled leaves are used for treating enlarged prostate.

An extract of the plant caused a fatal drop in blood pressure in rats.

The ethanolic extract of the fruits yields cyanogenic glucosides.

Ilex paraguariensis St.-Hil.

Family ► *Aquifoliaceae.*

Habitat ► Native to South America; cultivated in some Indian gardens. In northern India, grows in Lucknow.

English ► Mate Tea, Yerba Mate. Paraguay Tea.

Action ► Stimulant to brain and nervous system, mild antispasmodic, eliminates uric acid. Used for physical exhaustion, rheumatism, gout and nervous headache. (A national drink of Paraguay and Brazil.) Causes purging and even vomiting in large doses.

Key application ► In physical and mental fatigue. (*German Commission E, WHO.*) In fatigue, nervous depression, psychogenic headache especially from fatigue, rheumatic pains. (*The British Herbal Pharmacopoeia.*) *German Commission E* reported analeptic, positively inotropic, positively chronotropic, glycogenolytic, lipolytic and diuretic properties.

The leaves contain xanthine derivatives, including caffeine (0.2–2%), theobromine (0.3–00.5%), theophylline (absent in some samples), polyphenolics, tannins and chlorogenic acid, vanillin, vitamin C, volatile oil. Used in the same way as tea, due to its caffeine and theobromine content.

Mate is a world famous tea and is commonly consumed in several South American countries.

The flavour constituents exhibited moderate to weak broad-spectrum antimicrobial activity against several Gram-positive bacteria. Some components are bactericidal, particularly against the most carcinogenic bacteria, *Streptococcus mutans*.

Illicium anisatum Linn.

Family ► *Magnoliaceae; Illiciaceae.*

Habitat ► Indigenous to China.

English ► Star Anise.

Unani ► Baadiyaan (related species).

Action ► Carminative and pectoral. Used in hard, dry cough where expectoration is difficult. (Oil of Anise is distilled in Europe from the fruits of *Pimpinella anisum*.)

The seeds, though used as a substitute for Star Anise, contain toxic constituents, anisatin, neoanisatin, 6-deoxymajucin, besides pseudoanisatin and sesquiterpene lactones.

Illicium verum Hook. f.

Family ► *Magnoliaceae, Illiciaceae.*

Habitat ► Native to China. Fruits imported from China and Indo-China.

English ► Star Anise, Chinese Anise, Aniseed Stars.

Unani ► Baadyaan Khataai.

Siddha/Tamil ► Takkola, Anasippo.

Folk ► Anasphal.

Action ► Carminative (used for colic), stimulant, diuretic. Also used in rheumatism.

Key application ► In catarrhs of the respiratory tract and peptic discomforts. (*German Commission E.*)

The fruit contains a volatile oil containing *trans*-anethole 80–90%, and feniculin (14.56%), with estragole, beta-bisabolene, beta-farnesene, caryophyllene, nerolidol.

The intake of trans-anethole (1.0%) does not show any chronic toxicity in rats. Veranisatins, isolated from the extract, showed convulsive effect in mice. Methanolic extract exhibited a hypothermic effect in mice.

Illicium griffithii Hook. f. & Thoms. is found in Bhutan and Khasi hills at altitudes of 1,400–1,100 m. The fruit, known as Baadiyaan, is bitter and astringent, reported to be poisonous. It is used as stimulant and carminative. Essential oil resembles that from aniseed (*Pimpinella anisum* Linn.) and fennel (*Foeniculum vulgare* Mill.)

Impatiens balsamina Linn.

Family ► *Balsaminaceae.*

Habitat ► Cultivated in plains throughout India.

English ► Garden Balsam. (Balsam Apple is not related to *Impatiens*. It is the fruit of *Momordica balsamina*.)

Ayurvedic ► Tarini (provisional synonym).

Unani ► Gul-menhdi.

Siddha/Tamil ► Kasittumbai.

Action ► Cathartic, diuretic, antirheumatic. Flowers—used in burns and scalds.

The plant is reported to contain cyanochroic constituents, antibacterial substances and an alkaloid. The seeds contain the triterpenoid hosenkol A, the first baccharance triterpenoid from natural source. The seeds also contain a protein-associated amyloid, galactoxyloglucan and beta-sitosterol.

In China, the aerial parts are used for the treatment of articular rheumatism. In Korea, the plant is used for treating tuberculosis. In Brunei, a decoction of the root is given in irregular menstruation. In Japan, the juice, obtained from the white petals, is applied topically to treat several types of dermatitis, including urticaria.

The flowers contain flavonols, flavonoid pigments, phenolic compounds and quinones.

An ethanolic extract (35%) of flowers shows significant anti-anaphylactic activity in mice.

The methanolic extract of the whole plant exhibited strong antibacterial

activity against *Bacillus subtilis* and *Salmonella typhimurium*; antibacterial and antifungal activity has been attributed to a naphthoquinone derivative.

Imperata cylindrica Rausch.

Synonym ► *I. arundinacea* Cyr.

Family ► *Gramineae; Poaceae.*

Habitat ► The hotter parts of India, both in plains and hills, ascending up to 2,300 m in the Himalayas.

English ► Thatch Grass.

Ayurvedic ► Darbha, Suuchyagra, Yagnika, Yagyabhuushana, Bahir.

Siddha/Tamil ► Dharba.

Folk ► Daabh.

Action ► Diuretic, anti-inflammatory.

The rhizomes contain flavonoids, together with lignans, graminone A and B. A sesquiterpenoid, cylindrene, and biphenylether compounds, cylindol A and B, are also reported.

Cylindrene and graminone B show inhibitory activity on the contractions of vascular smooth muscles and aorta of rabbit respectively; while cylindol A exhibits 5-lipoxygenase inhibitory activity.

The hot aqueous extract of the rhizomes show moderate GTP activity on primary cultured rat hepatocytes intoxicated with carbon tetrachloride cytotoxicity.

The leaves and stem contain cyanochroic constituents. The roots contain antibacterial substances. The root is used in fevers but does not possess antipyretic activity.

Dosage ► Root—50–100 ml decoction. (*CCRAS.*)

Indigofera arrecta Hochst.

Family ► *Fabaceae.*

Habitat ► Cultivated in Assam, Bihar and in parts of Uttar Pradesh.

English ► Natal Indigo, Java Indigo, Bengal Indigo.

Ayurvedic ► Nili (related species).

Action ► See I. tinctoria.

Aqueous extract of the plant exhibits antihyperglycaemic activity in rats due to insulinotropic property.

The indigotin content of the plant (0.8–1.0%) is higher than that of other species of Indigofera. The leaves contain up to 4% of a flavonol glycoside which on hydrolysis yields rhamnose and kaempferol.

Indigofera articulata auct. non-Gouan.

Synonym ► *I. caerulea* Roxb.

Family ► *Fabaceae.*

Habitat ► Bihar and Western and Peninsular India.

English ► Egyptian Indigo, Arabian Indigo, Wild Indigo, Surat Indigo.

Ayurvedic ► Nili (related species).

Siddha/Tamil ► Aaramuri, Iruppumuri, Kattavuri.

Folk ► Surmai Nila.

Action ► Root, leaf—bitter tonic. Seed—anthelmintic.

Indigofera aspalathoides Vahl ex DC.

Family ▶ *Fabaceae.*

Habitat ▶ Plains of Karnataka, Andhra Pradesh and Tamil Nadu.

English ▶ Wiry Indigo.

Ayurvedic ▶ Nili (related species), Shivanimba.

Siddha/Tamil ▶ Sivanaarvembu, Iraivanvembu.

Folk ▶ Shivanimba (Maharashtra).

Action ▶ Antileprotic, antitumour, anti-inflammatory. Used in psoriasis and erysipelas. Ash of the burnt plant is used for dandruff. Root is used in aphthae.

Indigofera enneaphylla Linn.

Synonym ▶ *I. linnaei* Ali.

Family ▶ *Fabaceae.*

Habitat ▶ The Himalayas up to 1,200 m and in plains of India.

English ▶ Trailing indigo.

Ayurvedic ▶ Vaasukaa.

Siddha/Tamil ▶ Cheppunerinjil.

Folk ▶ Hanumaan-buuti, Bhui-nila.

Action ▶ Juice of the plant—antiscorbutic, diuretic, alterative. The plant, boiled with oil, is applied to burns. A decoction is given in epilepsy and insanity.

The plant contains two unsaturated hydrocarbons—indigoferin and enneaphyllin. The seeds contain 37.8% protein, also yield lipids (4.4%) containing palmitic and oleic acid. The toxicity of the plant is attributed to a non-protein amino acid, indospicine (6-amidino-2-aminohexanoic acid). (Consumption of the plant produces a neurological syndrome, known as Birdsville disease, in horses. The toxicity is greatly reduced when the material is chopped and dried.)

The aerial parts gave 3-nitropropanoyl esters of D-glucose.

Indigofera oblongifolia Forsk.

Synonym ▶ *I. paucifolia* Delile.

Family ▶ *Fabaceae.*

Habitat ▶ Throughout greater parts of India.

English ▶ Wild Indigo, Mysore Panicled Indigo.

Ayurvedic ▶ Bana-Nila, Dill, Jhill.

Unani ▶ Vasmaa.

Siddha/Tamil ▶ Kattukkarchamathi.

Folk ▶ Jhil (Gujarat).

Action ▶ Plant—antisyphilitic. All parts of the plant are found useful in enlargement of liver and spleen.

The leaves gave apigenin 7-rhamnoglucoside, apigenin 7, 4′-diglucoside, kaempferol-3-neohesperidoside and rhoifolin, along with protocatechuic, *p*-coumaric, *p*-hydroxybenzoic, salicylic and vanillic acid.

Indigofera pulchella Roxb. in part.

Synonym ▶ *I. cassioides* Rottl. ex DC.

Family ▶ *Fabaceae.*

Habitat ▶ The hills in India.

Ayurvedic ▶ Nili (related species).

Siddha/Tamil ▶ Nirinji.

Action ▶ Root—used for cough. Powder of the root applied externally for muscular pain in chest.

Leaves and roots—used for swelling of the stomach.

The seeds contain crude protein 27.6, pentosans 8.9 and water soluble gum 12.8%.

I

Indigofera tinctoria Linn.

Family ▶ *Fabaceae.*

Habitat ▶ Cultivated in many parts of India.

English ▶ Indigo.

Ayurvedic ▶ Nilikaa, Nilaa, Nila, Nili, Nilini, Nilapushpa, Ranjani, Shaaradi, Tutthaa.

Unani ▶ Habb-ul-Neel.

Siddha/Tamil ▶ Nili, Averi, Asidai, Attipurashadam.

Action ▶ Plant—antiseptic, hepatoprotective, hypoglycaemic, nervine tonic. Used in enlargement of liver and spleen, skin diseases, leucoderma, burns, ulcers, piles, nervous disorders, epilepsy, asthma, lumbago, gout. Leaf—anti-inflammatory. Used in blennorrhagia. Root—diuretic. Used in hepatitis. Root and stem—laxative, expectorant, febrifuge, anticephalalgic, antitumour, anthelmintic, promote growth of hair.

The Ayurvedic Pharmacopoeia of India recommends the use of dried whole plant in phobia, delusion and disturbed mental state.

Indicine (5–15 mg/g, dry basis) and the flavonoids, apigenin, kaempferol, luteolin and quercetin are present in various plant parts, maximum in the leaves and minimum in the roots (however quercetin was minimum in leaves). The presence of coumarins, cardiac glycosides, saponins and tannins is also reported.

Alcoholic extract of the aerial parts showed hepatoprotective activity in experimental animals against CCl_4-induced hepatic injury. The extract increased bile flow and liver weight in rats. The alcoholic extract also exhibited hypoglycaemic activity in rats.

The plant is used in the treatment of endogenous depression. It contains appreciable amounts of conjugated indoxyl (indican). The use of indigo and its constituents, indirubin and indigotin, prevents allergic contact dermatitis. The 8 weeks old tissues in culture contain maximum histamine content (5.0 mg/g dry weight).

Dosage ▶ Dried leaf—50–100 g for decoction; root—48 g for decoction (*API* Vol. II); whole plant—10–20 g for decoction. (*API* Vol. III.)

Indigofera trifoliata Linn.

Synonym ▶ *I. prostrata* Willd.

Family ▶ *Fabaceae.*

Habitat ▶ Throughout greater parts of India.

Folk ► Vana-methi.

Action ► Astringent, antileucorrhoeic, antirheumatic, alterative, restorative.

The seeds contain crude protein 31.5 pentosan 7.3, water soluble gum 3.0%.

Inula racemosa Hook. f.

Synonym ► *I. royleana* auct. *non-DC.*

Family ► *Compositae; Asteraceae.*

Habitat ► Temperate and Alpine Himalayas from Chitral to Nepal at 1,500–4,200 m.

English ► Elecampane.

Ayurvedic ► Pushkaramuula, Pushkara, Paushkara, Padmapatra, Kaashmira, Kushtha-bheda.

Action ► Antispasmodic, stomachic, antihistaminic, expectorant, anticatarrhal. Used for asthma, chronic bronchitis and pulmonary disorders.

Key application ► *Inula helenium*—as expectorant. (*The British Herbal Pharmacopoeia.*)

Roots are used in Kashmir as adulterant of *Saussurea lappa*.

The root contains a volatile oil, about 1–4%; major constituents being inulin (10.0) and sesquiterpene lactones, mainly alantolactone, isoalantolactone and their dihydro derivatives. Alantolactone and others in the mixture known as helenalin (sesquiterpene lactones) are toxic constituents of the root.

Alantolactone is anti-inflammatory in animals and has been shown to stimulate the immune system. It is also hypotensive and anthelmintic in animals; antibacterial and antifungal *in vitro* It irritates mucous membranes. It is used as an anthelmintic in Europe and UK.

Plant extract showed potent antispasmodic effect against bronchial spasm induced by histamine and various plant pollens.

The root, when combined with *Commiphora mukul* gum-resin, acts as a hypolipidaemic agent, exhibits beta-blocking activity and beneficial effect in myocardial ischaemia.

The roots also exhibit sedative and blood pressure lowering activity.

The European species is equated with *Inula helenium* Linn.

Dosage ► Root—1–3 g powder. (*API* Vol. IV.)

Ionidium suffruticosum Ging.

Synonym ► *Hybanthus enneaspermus* (Linn.) F. Muell.

Family ► *Violaceae.*

Habitat ► The warmer parts of India from Delhi to Bengal and throughout Deccan Peninsula.

Ayurvedic ► Amburuha.

Siddha/Tamil ► Orilaithamarai.

Folk ► Ratna-purush.

Action ► Diuretic, antigonorrhoetic and demulcent. Root—given in urinary infections, for bowel complaints of children.

The plant gave a dipeptide alkaloid, aurantiamide acetate and a triterpene, iso-arborinol, and beta-sitosterol.

Ipomoea aquatica Forsk.

Synonym ► *I. reptans* Poir.

Family ► *Convolvulaceae.*

Habitat ► Throughout the greater part of India.

English ► Swamp Cabbage.

Ayurvedic ► Kalambi, Naalikaa.

Siddha/Tamil ► Vellaikeerai, Koilangu.

Action ► Emetic and purgative. Used as an antidote to arsenical or opium poisoning. Plant juice is used for liver complaints; buds for ringworm.

The leaves are a good source of minerals (2.1%), vitamins (especially, carotene and tocopherol). Plant is given for nervous and general debility. Whole plant gave beta-carotene, xanthophyll, traces of taraxanthin, hentriacontane, beta-sitosterol and its glucoside.

The buds of pigmented variety are recommended as a food for diabetics. An insulin-like substance is reported from the buds.

The stems contain N-*trans*- and N-*cis*-feruloyltyramines, which have been found to be the inhibitors of *in vitro* prostaglandin synthesis.

The plant shows abundant growth in waste water and absorbs some organic and inorganic components, including heavy metals from waste water. The plant may be useful in the treatment of waste water by biogeofiltration.

Ipomoea batatas (Linn.) Lam.

Family ► *Convolvulaceae.*

Habitat ► Native to tropical America; cultivated throughout India for edible tubers.

English ► Sweet potato.

Ayurvedic ► Mukhaaluka, Rataalu, Raktaalu, Raktapindaka, Raktakanda.

Siddha/Tamil ► Sakkareivelleikulangu.

Unani ► Shakarkand, Rataalu.

Action ► Root—used in strangury, urinary discharges, burning sensation, thirst. Whole plant—used in low fever and skin diseases.

Cooked tubers contain reducing sugars 6.45, sucrose 2.23, maltose 8–64, dextrins 0.51 and polysaccharides 14–13%. Cooking increases the sweetness as a result of the hydrolysis of starch to maltose and dextrins through the action of beta-amylase.

Sweet potatoes are rich in starch content. During the storage a part of starch content is converted into reducing sugars and subsequently into sucrose. In a sample stored for 5 months, the starch content was reduced from 19.1% to 14.1% while the percentage of reducing sugars (as dextrose) and sucrose increased from 0.9 to 1.7 and 1.9 to 6.1% respectively.

Indian types with white flesh contain little or no carotene, while American types with pink flesh contain as high as 5.4–7.2 mg/100 g of carotene. Vitamins present in the tubers are : thiamine 0.09–0.14, riboflavin 0.05–0.10 and vitamin C 16–22 mg/100 g.

The hot aqueous extract of leaves exhibits significant inhibitory activity of rat lens aldose reductase (AR). Ellagic

and 3,5-dicaffoylquinic acids have been isolated as potent inhibitors.

The leaves also contain polysaccharides which increase the platelet count in experimental animals due to enhanced production of thrombopoietin.

From the stem and root, hexadecyl, octadecyl and eicosyl *p*-coumarates have been isolated.

The tubers show significant lectin activity and exhibit haemagglutinating activity in trypsinized rabbit erythrocytes.

Ipomoea bona-nox Linn.

Synonym ► *I. alba* Linn.
Calonyction bona-nox Bojer.
C. aculeatum (Linn.) House.

Family ► *Convolvulaceae.*

Habitat ► Throughout India.

English ► Moon Flower.

Ayurvedic ► Chandrakaanti, Gulchaandani, Dudhiaa Kalami.

Siddha/Tamil ► Naganamukkori.

Folk ► Chaandani, Dudhiaa Kalami.

Action ► Root bark—purgative. Leaves—used in filariasis.

The plant contains pentasaccharide glucoside of ethyl-11-hydroxy hexadecanoate. The seeds contain alkaloids, ipomine, isoipomine, methoxyipomine, dimethoxyipomine, ipalkidinium, ipalbidine and ipalbine.

Ipomoea digitata Linn.

Synonym ► *I. paniculata* R. Br. Burm.
I. mauritiana Jacq.

Family ► *Convolvulaceae.*

Habitat ► Tropical India in moist regions.

English ► Milky Yam.

Ayurvedic ► Kshira-vidaari, Kshirvalli, Payasvini, Swaadukandaa, Ikshukandaa, Gajavaajipriyaa, Kandapalaasha, Bhuumikuushmaanda.

Siddha ► Paalmudukkan kizhangu.

Folk ► Bilaaikanda. Bhuin Kakhaaru (Orissa).

Action ► Cholagogue, galactagogue, alterative, demulcent, purgative. Resin from root—uses similar to Jalap. Flour of raw rhizome is given in enlargement of liver and spleen, also for menorrhagia, debility and fat accumulation.

Rhizomes gave taraxerol acetate and beta-sitosterol. Fresh leaves contain 6.3 mg/100 g of carotene.

Vidaari is equated with *Pueraria tuberosa* DC. (*Fabaceae*). Dry pieces of *Dioscorea pentaphylla* Linn. are sold as Vidaari Kanda.

Dosage ► Tuber—3–6 g powder. (*CCRAS.*)

Ipomoea eriocarpa R. Br.

Synonym ► *I. hispida* Roem. & Schult.
I. sessiliflora Roth.

Family ► *Convolvulaceae.*

Habitat ► Throughout India.

Ayurvedic ► Aakhukarni (related species), Sheetavalli (provisional synonym).

Folk ► Nikhari, Bhanwar (Punjab).

Action ► Antirheumatic, anticephalalgic, antiepileptic and antileprotic.

The plant is boiled in oil and used as an application for rheumatism, headache, epilepsy, fevers, ulcers, leprosy. The seeds are reported to contain a resin similar to that present in the seeds of *Ipomoea nil*.

Ipomoea hederacea (L.) Jacq.

Synonym ► *Convolvulus hederacus* Linn.

Family ► *Convolvulaceae.*

Habitat ► North American species. Not found wild in India. Grown in Indian gardens.

Folk ► Krishna-bija, Kaalaadaanaa. Kakkattan (Tamil Nadu). Jirki (Andhra Pradesh).

Action ► Seed—purgative. Used as a substitute for Jalap (*Exogonium purga*).

The seed gave alkaloids—lysergol, chanoclavine, penniclavine, *iso*-penniclavine and elymoclavine.

Ipomoea marginata (Desr.) Verdc.

Family ► *Convolvulaceae.*

Habitat ► Throughout India in the plains, especially on the bank of stream and rivers.

Ayurvedic ► Lakshmanaa (Also equated with *Ipomoea obscura* (Linn.) Ker-Gawler.), Putradaa, Putrajanani.

Folk ► Tirutaalli (Kerala).

Action ► Used as a single drug for curing sterility in women, and for promoting fertility and virility.

The seeds of *Ipomoea obscura* contain non-ergolin type indole alkaloids, ipobscurine A and B and serotonin also alkaloid ipobscurine C.

Ipomoea muricata (Linn.) Jacq., non-Cav.

Synonym ► *I. turbinata* Lag. *Convolvulus muricatus* Linn.

Family ► *Convolvulaceae.*

Habitat ► The Himalayas, West Bengal, Bihar, Orissa, Maharashtra and South India.

English ► Traveller's Midnight Lilies.

Ayurvedic ► Krishnabija (related species). (Sold as Kaalaadaanaa, seeds of *Ipomoea nil.*)

Siddha/Tamil ► Kattu Talai.

Folk ► Michaai.

Action ► Purgative, febrifuge. Seeds—cardiac depressant, spasmolytic, hypotensive, antibacterial, antifungal. Plant juice destroys bedbugs.

The seeds contain resin glycosides which are laxative. Lysergol is also present in the seeds. It exhibits hypotensive, psychotropic, analgesic, and uterus and intestine-stimulating properties. The presence of indole alkaloids is reported in the seed.

Ipomoea nil (Linn.) Roth

Synonym ► *I. hederacea* auct., non-Jacq.
Convolvulus bilobatus Roxb.
Convolvulus nil Linn.

Family ► *Convolvulaceae.*

Habitat ► Throughout India; also occurs as a weed.

English ► Pharbitis seeds.

Ayurvedic ► Antah-kotarpushpi, Kaalaanjani (provisional synonym), Krishnabija, Kaalaadaanaa, Shyaamabija, Shankhani, Jhaaramaaricha.

Unani ► Kaalaadaanaa.

Siddha/Tamil ► Kaakkattan.

Action ► Purgative and blood-purifier. A substitute for Jalap. Seeds—antifungal.

The seeds from Pakistan contain alkaloids—lysergol, chanoclavine, penniclavine, isopenniclavine and elymoclavine. Also contain 14.2% resin and glucosides.

Commercial samples of the drug contain 14–15% of crude resinous matter. Research has shown that glycosidal part of the resin is inert; the non-glycosidal resin (2% of the drug) causes copious purgation in doses of 250 mg. Besides the resinous matter, the seeds contain a fixed oil (12.4%) and small amounts of saponin, mucilage and tannin.

The flowers of the plant contains anthocyanin pigments.

The plant extract exhibited hypoglycaemic activity in rats.

Dosage ► Seed—3–6 g powder. (*CCRAS.*)

Ipomoea pes-caprae (Linn.) Sweet.

Synonym ► *I. biloba* Forsk.

Family ► *Convolvulaceae.*

Habitat ► Near sea, especially on the West Coast.

English ► Goat's Foot Creeper.

Ayurvedic ► Chhagalaantri, Maryaada-valli.

Siddha/Tamil ► Adambu, Attukkal, Musattalai.

Action ► Astringent, stomachic, laxative, antidiarrhoeal, antiemetic, analgesic. Leaf—diuretic, anti-inflammatory. Used in colic, prolapsus ani; externally in rheumatism. Essential oil of leaves—antagonistic to histamine. Leaf extract is used for different types of inflammations including injuries caused by poisonous jelly-fish.

Clinical trials have proved that an extract (IPA) inhibited the action of jelly-fish toxins. Its topical application inhibited carrageenan-induced paw and ear oedema induced by arachidonic acid or ethyl phenylpropionate in rats. The crude extract of leaves also show inhibitory effect on prostaglandin synthesis *in vitro*.

Crude extract (IPA) of the leaves has also been shown to antagonize smooth muscle contraction induced by several agonists via non-specific mechanism. Antispasmodic isoprenoids,

beta-damascenone and E-phytol have been isolated from the extract. The antispasmodic activity was found to be in the same range as that of papaverine.

The alcoholic extract of leaves showed insulinogenic and hypoglycaemic activities in rats, comparable to the hypoglycaemic drug chlorpropamide.

The leaves and seeds contain indole alkaloid. Plant also contains a steroid, an amide, pentatriacontane, triacontane, volatile oil and behenic, melissic, butyric and myristic acids.

Ipomoea petaloidea Choisy.

Synonym ▶ *Operculina petaloidea* Choisy.

Family ▶ *Convolvulaceae.*

Habitat ▶ Throughout India; ascending to 300 m.

Ayurvedic ▶ Shyaamaa, Chhaagalaantri, Vriddhadaaraka, Vriddhadaaru. *Argyreia nervosa* (Burm. f.) Boj., synonym *A. spiciosa* Sweet, *Convolvulaceae*, is equated with Vriddhadaaru and Vriddhadaaruka, while *Ipomoea petaloidea* and *I. pes-caprae* are also known by identical synonyms. *Operculina turpethum*, synonym *I. turpethum* is used as a substitute for *I. petaloidea*.

Unani ▶ Shaaraf.

Siddha ▶ Nilapoosani.

Folk ▶ Bidhaaraa, Nishoth (black var.)

Action ▶ Purgative. Used as a supporting herb for diseases of the nervous system.

Dosage ▶ Leaf, root—3–6 g powder; leaf juice—5–10 ml. (*CCRAS.*)

Ipomoea purga Hayne.

Synonym ▶ *I. jalapa* Scheide and Deppe.
Exogonium purga (Hayne) Benth.

Family ▶ *Convolvulaceae.*

Habitat ▶ Cultivated in the Nilgiris and Poona.

English ▶ Jalap.

Folk ▶ Jalaapaa.

Action ▶ Strong cathartic and purgative. Usually used with carminatives.

Resin from dried root (commercial jalap) contains beta-D-quinovoside of 11-OH-tetradecanoic acid. The glycosidal resin is known as "convolvulin".

Ipomoea purpurea (Linn.) Roth.

Family ▶ *Convolvulaceae.*

Habitat ▶ Native of tropical America; found throughout greater part of India, grown in gardens.

English ▶ Tall Morning-Glory.

Folk ▶ Karakatiyaa (seeds).

Action ▶ Purgative. Seed extract—antibacterial.

The stem contains a soft resin (4.8%), essential oil (0.08%) and tannin. The

resin is the active principle, it contains ipuranol, which is identical with sitosterol glucoside, ipurolic acid, *d*-methyl acetic acid, hydroxylauric acid and glucose.

Ipomoea quamoclit Linn.

Synonym ▶ *Quamoclit pinnata* Bojer.

Family ▶ *Convolvulaceae.*

Habitat ▶ Native to tropical America; grown as an ornamental.

English ▶ Cypress Vine, Indian Pink.

Ayurvedic ▶ Kaamalataa.

Siddha/Tamil ▶ Kembumalligai, Mayirmanikkam.

Folk ▶ Sitaakesh.

Action ▶ Powdered root is given as a sternutatory. Pounded leaves are applied to bleeding piles.

The leaves and stems are reported to contain small amounts of alkaloids. Traces of hydrocyanic acid are present also in roots, stems and flowers.

Ipomoea reniformis Choisy.

Synonym ▶ *Merremia emarginata* (Burm. f.) Hallier f.
M. gangetica (L.) Cufod.

Family ▶ *Convolvulaceae.*

Habitat ▶ In damp places in upper Gangetic plains; Bihar, Bengal, Peninsular India.

Ayurvedic ▶ Aakhuparni, Aakhuparnika, Muusaakarni, Aakhukarni. Undurukarnikaa. (Also equated with Dravanti.)

Siddha/Tamil ▶ Yelikkaadhukeerai, Perettaikkirai.

Action ▶ Deobstruent, diuretic, alterative. Used for rheumatic affections, neuralgia, headache, skin diseases and urinary affections.

Evolvulus nummularis Linn. (*Convolvulaceae*) is also known as Muusaakarni (Muusaakaani) and is used for cutaneous affections.

I

Ipomoea sepiaria Koen. ex Roxb.

Synonym ▶ *I. maxima* (Linn. f.) G. Don.

Family ▶ *Convolvulaceae.*

Habitat ▶ Throughout greater part of India.

Ayurvedic ▶ Banakalami, Hanumaan-Vel, Manjika. (Also equated with Lakshmanaa.)

Siddha/Tamil ▶ Thaalikeerai (Lakshmanaa of the South).

Action ▶ Juice of the plant—deobstruent, diuretic, hypotensive, uterine tonic, antidote to arsenic poisoning. Seeds—cardiac depressant, hypotensive, spasmolytic.

Ipomoea vitifolia Blume.

Synonym ▶ *Merremia vitifolia* (Burm. f.) Hallier.
Convululus vitifolius Burm. f.

Family ▶ *Convolvulaceae.*

Habitat ▶ Throughout warmer parts of India, except the north-western arid region.

Folk ► Nauli, Nawal (Maharashtra).

Action ► Diuretic. Used in strangury, urethral discharges.

Iris ensata Thunb.

Family ► *Iridaceae.*

Habitat ► Temperate Northwestern Himalaya at 1,500–2,700 m. and from Kashmir to Himachal Pradesh. Often grown in gardens.

Ayurvedic ► Paarseeka Vachaa, Haimavati, Shveta Vachaa, Baal-bach.

Unani ► Irsaa, Sosan, Iris.

Folk ► Marjal, Unarjal (Kashmir).

Action ► Used in diseases of the liver.

Aerial parts contain xanthone glycosides; C-glycoside of apigenin and phenolic acids. Roots contain ceryl alcohol.

Natural irones, the main constituent of Orris oil, are obtained from different species of Iris. The laccases, obtained from Iris species and other plants are used in hair cosmetic preparations, as an oxidizing agent in oxidative hair dyes and permanent hair wave-setting compositions. The root extracts of Iris species are used in cosmetic preparations for the prevention of skin roughness and ageing.

Iris germanica Linn.

Family ► *Iridaceae.*

Habitat ► Native of Italy and Morocco; cultivated in Kashmir, also found run wild on graves.

English ► Orris, Iridis Rhizome, German Iris.

Ayurvedic ► Paarseeka Vachaa, Haimavati, Shveta Vachaa (also considered as Pushkarmuula), Baal-bach.

Action ► Demulcent, antidiarrhoeal, expectorant. Extract of the leaf is used for the treatment of frozen feet.

Key application ► In irritable bowel, summer diarrhoea in children, in stubborn cases of respiratory congestion. (Folk medicine.) (Claims negatively evaluated by *German Commission E*: "blood-purifying," "stomach-strengthening" and "gland-stimulating.")

The rhizomes gave triterpenes, beta-sitosterol, alpha-and beta-amyrin and isoflavonoids; an essential oil, about 0.1–2%, known as "Orris butter," consisting of about 85% myristic acid, with irone, ionone, methyl myristate. Isoflavonoids include irisolidone, irigenin and iridin. In volatile oil, chief constituents are *cis*-alpha and *cis*-gamma-irones. Triterpenes include iridal and irigermanal. Rhizomes also gave xanthones C. glucosylxanthones (Orris root is the root of *Iris germanica*. In homoeopathy, *Iris versicolor* is used.)

Related species ► *I. florentina* Linn.; *I. pallida* Lam.

Iris kemaonensis Wall.

Family ► *Iridaceae.*

Habitat ► The Himalayas from Garhwal to Arunachal Pradesh at 2,400–3,600 m.

Folk ► Karkar, Tezma (Punjab).

Action ► Diuretic, spasmolytic, febrifuge; antidote for opium addiction.

The rhizomes contain isoflavones—iridin, iriskumaonin and its methyl ether, irisflorentin, junipegenin A and irigenin.

Iris nepalensis D. Don.

Family ► *Iridaceae.*

Habitat ► Temperate Himalaya and in Khasi Hills.

Ayurvedic ► Paarseeka Vachaa.

Folk ► Sosan, Shoti, Chalnundar, Chiluchi.

Action ► Deobstruent (in bilious obstructions), diuretic, cathartic. Used in diseases of the liver.

The plant contains an isoflavone, irisolidone. Rhizomes contain irisolone and irigenin.

Iris pseudacorus Linn.

Family ► *Iridaceae.*

Habitat ► On river banks, by the side of lakes, ponds. Native to Great Britain.

English ► Yellow Flag.

Folk ► Paashaanabheda (Gujarat).

Action ► Cathartic and acrid. Used in dysmenorrhoea and leucorrhoea. Juice of the root—used for obstinate coughs and convulsions.

Rhizomes contain a glycoside, irisin, iridin or irisine, reportedly present, with myristic acid.

Iris versicolour Linn.

Family ► *Iridaceae.*

Habitat ► In swamps. Native to America and Canada.

English ► Blue Flag Root, Liver Lily.

Ayurvedic ► Haimavati Vachaa.

Action ► Anti-inflammatory, astringent, cholagogue, laxative, diuretic, antiemetic, blood and lymph purifier, alterative for sluggish conditions of liver, gallbladder and glandular system.

Key application ► As laxative. (*The British Herbal Pharmacopoeia*.)

The rhizomes contain a volatile oil; a glycoside, iridin; acids including salicylic and isophthalic; a monocyclic C31 triterpenoid; sterols, gum, resin. Irisin is the toxic constituent of the resin. It irritates the mucous membrane, liver and pancreas.

The drug is contraindicated in pregnancy. The root powder is toxic at 2 g and fluid extract at 3.7 ml.

Isatis tinctoria Linn.

Family ► *Crucifere; Brassicaceae.*

Habitat ► Native to Afghanistan and Western Tibet. Now cultivated as an ornamental.

English ► Dyer's Woad.

Action ► Plant—used in the form of an ointment for ulcers, oedematous and malignant tumours. Leaves—antimicrobial, antifungal.

The aerial parts yield tryptanthrin, indole-3-acetonitrile and *p*-coumaric acid methylester.

The roots contain anti-blood platelet aggregation constituents, uridine, hypoxanthine, uracil and salicylic acid together with indigo, palmitic acid and beta-sitosterol.

In China, tablets made from the leaves and roots of *Isatis tinctoria* and *Artemisia scoparia* have been found to be effective in treating hepatitis B patients.

Ixora coccinea Linn.

Family ► *Rubiaceae.*

Habitat ► South-western Peninsular India. Cultivated throughout India.

English ► Jungleflame Ixora.

Ayurvedic ► Bandhuka, Paaranti.

Siddha/Tamil ► Vetchi, Thechii.

Folk ► Rukmini, Rangan.

Action ► Herb—astringent, antiseptic, blood-purifier, sedative, antileucorrhoeic, antidiarrhoeal, anti-catarrhal. Used in dysmenorrhoea, haemoptysis, bronchitis. Root—astringent, antiseptic (used against scabies and other skin diseases). Flowers—prescribed in dysentery and dysmenorrhoea.

The saponifiable fraction of the petroleum ether extract of roots exhibited anti-inflammatory activity in carrageenan-induced paw oedema in albino rats.

The leaves contain a triterpenoid, lupeol, which shows anti-inflammatory activity. The crude alcoholic extract and the ethyl acetate fraction exhibited antigenic activity.

The flowers contain an essential oil (0.5%) which possesses antimicrobial activity. Flower contain leucocyanidin glycoside.

The plant substrate removes heavy metals, such as lead, cadmium and mercury from polluted water.

Ixora pavetta Andr.

Synonym ► *I. Parviflora* Vahl.

Family ► *Rubiaceae.*

Habitat ► West Bengal, Bihar, Western Central and South India.

English ► Torchwood Tree.

Ayurvedic ► Nevaari, Nevaali, Ishwara, Rangan.

Siddha/Tamil ► Shulundu-kora, Korivi.

Action ► Flowers—pounded with milk, for whooping cough. Bark—a decoction for anaemia and general debility. Fruit and root—given to females when urine is highly coloured. The leaves contain ixoral and beta-sitosterol. Leaves and flowers gave

flavonoids—rutin and kaempferol-3-rutinoside; stems gave a flavone glycoside, chrysin 5-O-beta-D-xylopyranoside. The aerial parts contain 6,7-dimethoxycoumarin. The seed oil gave capric, lauric, myristic, palmitic, stearic, arachidic, behenic, oleic and linoleic acids.

Ixora javanica (Blume) DC.

Family ► *Rubiaceae.*

Habitat ► Gardens of Kerala and West Bengal.

Action ► Leaves, flowers—cytotoxic, antitumour.

The ethanolic, extract of leaves showed cytotoxic activity against Dalton's lymphoma, Ehrlich ascites carcinoma and Sarcoma 180 tumour cells in vitro. The flowers have been found to contain antitumour principles, active against experimentally induced tumour models.

J

Jacaranda acutifolia
auct. non-Humb. & Bonpl.

Synonym ► *J. mimosifolia* D. Don
J. ovalifolia R. Br.

Family ► *Bignoniaceae.*

Habitat ► Cultivated in Indian gardens.

Folk ► Nili-gulmohar.

Action ► Leaves' volatile oil—applied to buboes. Leaves and bark of the plant—used for syphilis and blennorrhagia. An infusion of the bark is employed as a lotion for ulcers.

The leaves contain jacaranone, verbascoside and phenylacetic-beta-glucoside along with a glucose ester, jacaranose. Flavonoid scutellarein and its 7-glucuronide, and hydroquinones were also isolated. Fruits contain beta-sitosterol, ursolic acid and hentriacontane; stem bark gave lupenone and beta-sitosterol.

The flowers contain an anthocyanin. In Pakistan, the flowers are sold as a substitute for the Unani herb Gul-e-Gaozabaan.

The lyophylized aqueous extract of the stem showed a high and broad antimicrobial activity against human urinary tract bacteria, especially *Pseudomonas* sp.

The fatty acid, jacarandic acid, isolated from the seed oil, was found to be a strong inhibitor of prostaglandin biosynthesis in sheep.

J. rhombifolia G. F. W. May., syn. *J. filicifolia* D. Don is grown in Indian gardens. Extracts of the plant show insecticidal properties.

Several species of Jacaranda are used for syphilis in Brazil and other parts of South America under the names carobin, carabinha etc. A crystalline substance, carobin, besides resins, acids and caroba balsam, has been isolated from them.

Jasminum angustifolium Vahl.

Family ► *Oleaceae.*

Habitat ► South India.

English ► Wild Jasmine.

Ayurvedic ► Bana-mallikaa, Vana-malli, Kaanan-mallikaa, Aasphotaa.

Siddha/Tamil ► Kaatumalli.

Action ► Root—used in ringworm. Leaves—juice is given as an emetic in cases of poisoning.

Fresh flowers gave indole.

Jasminum arborescens Roxb.

Synonym ► *J. roxburghianum* Wall.

Habitat ► Sub-Himalayan tract, Bengal, Central and South India.

English ► Tree Jasmine.

Ayurvedic ► Nava-mallikaa.

Siddha/Tamil ► Nagamalli.

Folk ► Chameli (var.), Maalati (var.).

Action ► Leaves—astringent and stomachic. Juice of the leaves, with pepper, garlic and other stimulants, is used as an emetic in obstruction of the bronchial tubes due to viscid phlegm.

Jasminum auriculatum Vahl.

Family ► *Oleaceae.*

Habitat ► Cultivated throughout India, especially in Uttar Pradesh and Tamil Nadu. In Uttar Pradesh, cultivated on commercial scale in Ghazipur, Jaunpur, Farrukhabad and Kannauj for its fragrant flowers which yield an essential oil.

Ayurvedic ► Yuuthikaa, Yuuthi, Mugdhee.

Siddha/Tamil ► Usimalligai.

Folk ► Juuhi.

Action ► See *Jasminum humile.*

The leaves gave lupeol, its epimer, hentriacontane and *n*-tricantanol, a triterpenoid, jasminol; *d*-mannitol; volatile constituent, jasmone. The pin type pointed flower buds (long styled) on solvent extraction yielded higher concrete content rich in indole and methyl anthranilate, whereas thrum type (short styled) buds yield higher absolute with benzyl acetate as the prominent constituent.

Jasminum flexile Vahl.

Synonym ► *J. azoricum* Linn.

Family ► *Oleaceae.*

Habitat ► Assam, Mizoram, Meghalaya and Western Ghats.

Ayurvedic ► Maalati (var.).

Siddha/Tamil ► Ramabanam mullai.

Folk ► Chameli (var.).

Action ► See *Jasminum officinale.*

Jasminum heterophyllum Roxb. non-Moench.

Family ► *Oleaceae.*

Habitat ► Nepal, North Bengal, Assam hills, Khasi hills and Manipur.

Ayurvedic ► Svarna-yuuthikaa (var.).

Folk ► Juuhi (yellow var.).

Action ► See *Jasminum humile.*

Jasminum humile Linn.

Synonym ► *J. humile* auct. non L. *J. bignoniaceum* Wall ex G. Don.

Family ► *Oleaceae.*

Habitat ► Sub-tropical Himalayas from Kashmir to Nepal and in the Nilgiris, Palni Hills, Western Ghats and Kerala.

English ► Yellow Jasmine, Nepal Jasmine, Italian Jasmine.

Ayurvedic ► Svarna-yuuthikaa, Svarnajaati, Hemapushpikaa, Vaasanti.

Siddha/Tamil ► Semmalligai.

Folk ► Juuhi (yellow var.).

Action ► Flower—astringent, cardiac tonic. Root—used in ringworm. The milky juice, exuded from incisions in the bark, is used for treating chronic fistulas. The plant is also used for treating hard lumps.

The leaves gave alpha-amyrin, betulin, friedelin, lupeol, betulinic, oleanolic and ursolic acids; beta-sitosterol, 10-cinnamoyloxyoleoside-7-methylester (jasminoside) and a secoiridoid glycoside.

Jasminum malabaricum Wight.

Family ► *Oleaceae.*

Habitat ► Deccan, West Coast, Western Ghats and in the Nilgiris.

Ayurvedic ► Mudgara.

Folk ► Mogaraa (var.), Ran-mogaraa.

Action ► See *Jasminum sambac.*

Jasminum multiflorum (Burm. f.) Andr.

Synonym ► *J. pubescens* Willd.
J. hirsutum Willd.
J. bracteatum Roxb.

Family ► *Oleaceae.*

Habitat ► Sub-Himalayan tract and in moist forests of Western Ghats.

English ► Downy Jasmine.

Ayurvedic ► Kunda, Kasturi Mogaraa.

Siddha/Tamil ► Magarandam, Malli.

Folk ► Kasturi Mogaraa.

Action ► Diuretic, emetic. Boiled bark—applied on burns.

Ethanolic extract of fresh leaves and flowers contain the secoiridoid lactones, jasmolactone A, B, C and D; and secoiridoid glycosides. Jasmolactone B and D and the secoiridoid glycosides (multifloroside and 10-hydroxyoleuropein) exhibited vasodilatory and cardiotropic activities.

Jasminum officinale Linn. var. **grandiflorum** (L.) Kobuski.

Synonym ► *J. grandiflorum* Linn.

Family ► *Oleaceae.*

Habitat ► North-Western Himalayas and Persia; cultivated in Kumaon, Uttar Pradesh, Rajasthan, Madhya Pradesh; in gardens throughout India.

English ► Spanish Jasmine.

Ayurvedic ► Jaati, Jaatikaa, Jaatimalli, Pravaaljaati, Saumanasyaayani, Sumanaa, Chetikaa, Hriddgandhaa, Maalati, Chameli.

Unani ► Yaasmin.

Siddha/Tamil ► Manmadabanam, Mullai, Padar-malligai, Pichi, Malli

Folk ► Chameli.

Action ► Flowers—calming and sedative, CNS depressant, astringent and mild anaesthetic. A syrup prepared from the flowers is used for coughs, hoarsenesses and other disorders of the chest. Plant—diuretic, anthelmintic, emmenagogue; used for healing chronic ulcers and skin diseases. Oil—externally relaxing.

Indian oil sample gave benzyl acetate 26.3, benzyl benzoate 19.2, phytol 10.6, jasmone 8.5, methyl jasmonate 6.3, linalool 5.4, geranyl linalool 3.5, eugenol 2.9, isophytyl acetate 2.7, and isophytol 2.4%.

The leaves gave ascorbic acid, anthranilic acid and its glucoside, indole oxygenase, alkaloid jasminine and salicylic acid.

The flowers contain pyridine and nicotinate derivatives; tested positive for indole.

The flowers and leaf juice is used for treating tumours.

Dosage ► Dried leaves—10–20 g powder for decoction (*API,* Vol. III.); Juice—10–20 ml. (*CCRAS.*).

J

Jasminum rottlerianum Wall. ex DC.

Family ► *Oleaceae.*

Habitat ► Western Peninsula, from Konkan southwards to Kerala.

Ayurvedic ► Vana-mallikaa.

Siddha/Tamil ► Erumaimullai, Kattumalligei, Uyyakondan.

Action ► Leaf—used in eczema.

Jasminum sambac (Linn.) Ait.

Family ► *Oleaceae.*

Habitat ► Cultivated throughout India, especially in Uttar Pradesh, on a large scale in Jaunpur, Kannauj, Ghazipur and Farrukhabad for its fragrant flowers.

English ► Arabian Jasmine, Tuscan Jasmine, Double Jasmine.

Ayurvedic ► Mallikaa, Madayanti, Madyantikaa, Nava-Mallikaa, Shita-bhiru, Vaarshiki.

Unani ► Mograa.

Siddha ► Malligai.

Folk ► Belaa, Motiaabelaa; Mogaraa (Maharashtra).

Action ► Root—emmenagogue, blood purifier. Flowers—lactifuge. Alcoholic extract—hypotensive. Leaves—antibacterial; used against indolent and breast tumours.

The leaves contain the secoiridoid glycosides, jasminin, quercitrin, isoquercitrin, rutin, quercitrin-3-dirhamnoglycoside, kaempferol-3-rhamnoglycoside, mannitol, alpha-amyrin, beta-sitosterol and an iridoid glycoside, sambacin. The absolute contains several pyridine and nicotinate derivatives.

Dosage ► Decoction—50–100 ml. (*CCRAS.*)

Jateorhiza palmata Miers.

Synonym ► *J. calumba* Miers.

Family ► *Menispermaceae.*

Habitat ► Indigenous to south-east tropical Africa. Imported into India.

English ► Calumba, Colombo.

Ayurvedic ► Kalambaka. (*Coscinium fenestratum* Colebr., known as False calumba, is used as a substitute for *J. palmata.*)

Siddha/Tamil ► Kolumbu.

Action ► Root—bitter tonic without astringency, carminative, gastric tonic, antiflatulent, hyptotensive, orexigenic, uterine stimulant, sedative. Used in anorexia, poor digestion, hypochlorhydria, amoebic dysentery and menstrual disorders. Antifungal.

Key application ► As appetite stimulant. (*The British Herbal Pharmacopoeia.*)

The root gave isoquinoline alkaloids 2–3%; palmatine, jaterorrhizine and its dimer *bis*-jateorrhizine, columbamine; bitters (including chasmanthin and palmanin). Volatile oil contains thymol.

The alkaloid jateorrhizine is sedative, hypotensive. Palmatine is a uterine stimulant.

As calumba contains very little volatile oil and no tannins, it is free from astringency which is common with other bitter herbs.

The root alkaloids exhibit narcotic properties and side effects similar to morphine. It is no longer used (in Western herbal) as a digestive aid, and is rarely used as an antidiarrhoeal agent. (*Natural Medicines Comprehensive Database,* 2007.)

Jatropha curcas Linn.

Family ► *Euphorbiaceae.*

Habitat ► Native to tropical America. Now cultivated along with Cromandel Coast and in Travancore.

English ► Physic Nut, Purging Nut.

Ayurvedic ► Vyaaghrairanda (var.), Sthula-eranda, Kaanan-eranda.

Siddha/Tamil ► Kattu Amanaku.

Folk ► Bagharenda (var.).

Action ► Seed—highly toxic. Nut—purgative. Plant—used for scabies, ringworm, eczema, whitlow, warts, syphilis. Stem bark—applied to wounds of animal bites; root bark to sores.

The protein of the seed contains the toxic albumin curcin (protein 18.0%, curcin 0.005%).

Seed and seed oil—more drastic purgative than castor seed oil and milder than *Croton tiglium* oil.

An aqueous (10%) infusion of leaves increased cardiac contraction is small doses. EtOH (50%) extract of aerial parts—diuretic and CNS depressant.

The seed contain phorbol derivatives. The plant also contains curcosones and lathyrane diterpenes.

Jatropha glandulifera Roxb.

Family ► *Euphorbiaceae.*

Habitat ► South India and Bengal.

Ayurvedic ► Vyaaghrairanda.

Siddha/Tamil ► Adalai, Eliyamanakku.

Folk ► Bagharenda, Jangali-erandi.

Action ► Root and oil from seed—purgative. Oil—antirheumatic, antiparalytic. Used externally on ringworm and chronic ulcers. Root—used for glandular swellings.

J

Latex—applied to warts and tumours.

The plant contain alkannins (isohexenylnaphthazarins). The presence of alkannins in this plant (a member of *Euphorbiaceae*) should be considered as an exception.

The root gave jatropholone A, fraxetin and a coumarinolignan.

Dosage ► Seed—50–100 mg powder. (*CCRAS.*)

J

Jatropha gossypifolia Linn.

Family ► *Euphorbiaceae.*

Habitat ► Native to Brazil; cultivated as an ornamental.

English ► Tua-Tua.

Ayurvedic ► Rakta-Vyaaghrairanda.

Siddha/Tamil ► Stalai.

Folk ► Laal Bagharenda.

Action ► Leaf and seed—purgative. Leaf—antidermatosis. Bark—emmenagogue. Seed—emetic. Seed fatty oil—used in paralytic affections, also in skin diseases.

The leaves contain triterpenes, a trihydroxy ketone and corresponding diosphenol. The root contains the diterpenes, jatropholone A and jatrophatrione. A tumour-inhibitor macrocyclic diterpene, jatrophone, has been isolated from roots.

The seeds contain phorbol derivatives, jatropholones A and B, hydroxyjatrophone and hydroxyisojatrophone.

Hot water extract of the plant exhibits antimalarial activity against *Plasmodium falciparum.*

Jatropha multifida Linn.

Family ► *Euphorbiaceae.*

Habitat ► Native to South America. Naturalized in various parts of India.

English ► Coral plant, Physic Nut.

Ayurvedic ► Brihat-Danti (bigger var. of Danti, also equated with *Baliospermum montanum*).

Folk ► Danti (var.).

Action ► Seeds—purgative, emetic. Fruits—poisonous. Leaves—used for scabies. Latex—applied to wounds and ulcers.

The latex from the plant showed antibacterial activity against *Staphylococcus aureus.* It contains immunologically active acylphloroglucinols, multifidol, phloroglucinol and multifidol beta-D-glucopyranoside. The latex also contains an immunologically active, cyclic decapeptide, labaditin.

J. panduraefolia Andr. (native to America), widely grown in Indian gardens, is known as Fiddle-leaved Jatropha. The latex from the plant shows fungitoxic activity against ringworm fungus, *Microsporum gypseum.*

Juglans regia Linn.

Family ► *Juglandaceae.*

Habitat ► Native to Iran; now cultivated in Kashmir, Himachal Pradesh., Khasi Hills and the hills of Uttar Pradesh.

English ► Walnut tree.

Ayurvedic ► Akshoda, Akshodaka, Akshota, Shailbhava, Pilu, Karparaal, Vrantphala.

Unani ► Akhrot.

Siddha/Tamil ► Akrottu.

Action ► Leaves and bark—alterative, laxative, antiseptic, mild hypoglycaemic, anti-inflammatory, antiscrofula, detergent. An infusion of leaves and bark is used for herpes, eczema and other cutaneous affections; externally to skin eruptions and ulcers. Volatile oil—antifungal, antimicrobial.

Key application (leaf) ► In mild, superficial inflammation of the skin and excessive perspiration of hands and feet. (*German Commission E.*). When English Walnuts (*Juglans regia*) are added to low fat diet, total cholesterol may be decreased by 4–12% and LDL by 8–16%. (*Natural Medicines Comprehensive Database,* 2007.)

Walnut hull preparations are used for skin diseases and abscesses.

Walnut is eaten as a dry fruit. Because of its resemblance to the brain, it was thought, according to the "doctrine of signatures", to be a good brain tonic. Walnuts are also eaten to lower the cholesterol levels.

From the volatile oil of the leaves terpenoid substances (monoterpenes, sesquiterpenes, diterpene and triterpene derivatives) and eugenol have been isolated. Fatty acids, including geranic acid; alpha-and beta-pinene, 1,8,cincole, limonene, beta-eudesmol and juglone are also important constituents of the volatile oil.

The leaves contain napthoquinones, mainly juglone. The root bark gave 3, 3′,-*bis*-juglone and oligomeric juglones. Unripe fruit husk also gave napthoquinones.

The kernels of Indian walnuts contain 15.6% protein, 11% carbohydrates, 1.8% mineral matter (sodium, potassium, calcium, magnesium, iron, copper, phosphorus, sulphur and chorine). Iodine (2.8 mcg/100 g), arsenic, zinc, cobalt and manganese are also reported. Kernels are also rich in vitamins of the B group, vitamin A (30 IU/100 g), and ascorbic acid (3 mg/100 g).

The juice of unripe fruits showed significant thyroid hormone enhancing activity (prolonged use of such extract may cause serious side effect).

White Walnut, Lemon Walnut, Butternut, Oilnut of the USA is equated with *Juglans cineraria* L. The inner bark gave napthoquinones, including juglone, juglandin, juglandic acid, tannins and an essential oil.

Butternut is used as a dermatological and antihaemorrhoidal agent. Juglone exhibits antimicrobial, antiparasitic and antineoplastic activities.

Dosage ► Dried cotyledons—10–25 g (*API,* Vol. II.)

Juncus effusus Linn.

Synonym ► *J. communis* E. Mey.

Family ► *Juncaceae.*

Habitat ► Eastern Himalayas and Khasi Hills.

English ► Rush, Matting Rush.

Action ► Pith—antilithic, discutient, diuretic, depurative, pectoral. Root—diuretic, especially in strangury.

The leaves gave flavonoids, lutcoline-7-glucoside, diosmin and hesperidin; aerial parts gave phenolic constituents, effusol and juncusol. Juncusol is antimicrobial. A dihydrodibenzoxepin, isolated from the plant, showed cytotoxic activity.

Juniperus communis Linn. var. saxatillis Palias.

Synonym ► *J. communis* auct. non L.

Family ► *Pinaceae; Cupressaceae.*

Habitat ► Native to Europe and North America. Distributed in Western Himalayas from Kumaon westwards at 1,700–4,200 m.

English ► Common Juniper.

Ayurvedic ► Hapushaa, Havushaa, Haauber, Matsyagandha.

Unani ► Abahal, Haauber, Hubb-ul-arar, Aarar.

Action ► Berries—diuretic, urinary antiseptic, carminative, digestive, sudorific, anti-inflammatory, emmenagogue. Used for acute and chronic cystitis, renal suppression (scanty micturition), catarrh of the bladder, albuminuria, amenorrhoea, leucorrhoea. Aerial parts—abortifacient.

Key application ► In dyspepsia. (*German Commission E.*) Juniper berry may increase glucose levels in diabetics. (*ESCOP.*) As a diuretic. (*The British Herbal Pharmacopoeia.*) *The Ayurvedic Pharmacopoeia of India* recommends the dried fruit in malabsorption syndrome.

Animal studies have shown an increase in urine excretion as well as a direct effect on sooth muscle contraction. (*German Commission E, ESCOP.*) Contraindicated in kidney disease. (Sharon M. Herr.)

(In Kerala, Hapushaa and Mundi are considered to be synonyms; *Syphaeranthus indicus,Asteraceae,* is used as Hapushaa.)

The major constituents of the volatile oil are alpha-pinene, sabinene and alpha-terpinene. Methanolic extract of the plant gave several labdane diterpenoids and diterpenes. The leaves contain the biflavones, cupressuflavone, amentoflavone, hinokiflavone, isocryptomerin and sciadopitysin. The berries also contain condensed tannins. Seeds gave haemagglutinin.

Juniperus recurva Buch-Ham ex D. Don, syn. *J. excelsa* auct. non-Bieb. (temperate Himalaya from Kashmir to Bhutan) is known as Weeping Blue Juniper. *J. macropoda* Boiss. (the Himalaya from Nepal onwards) is known as Himalayan Indian Juniper. Both the species are used like *J. communis* var. *saxatillis.*

The berries gave a diterpene ketone, sugrol, beta-sitosterol glucoside and 10-nonacosanol.

Plant extract can be used in toothpastes and mouth-rinses to reduce dental plaque and bleeding.

Dosage ► Dried fruit—2–6 g powder. (*API,* Vol. III.)

Juniperus virginiana Linn.

Family ► *Pinaceae; Cupressaceae.*

Habitat ► Native to North America; introduced into India.

English ► Pencil Cedar, Red Cedar.

Action ► The berries in decoction are diaphoretic and emmenagogue like those of common juniper; leaves are diuretic. Red cedar oil is used in the preparation of insecticides. Small excrescences, called cedar apples, are sometimes found on the branches. These are used as an anthelmintic. (Yellow Cedar is equated with *Thuja occidentalles.*)

Juniperus procera Hochst. (East African Cedar), *J. bermudiana* Linn. (Bermuda Cedar) and *J. Chinensis* Linn. (Chinese Juniper) have also been introduced into India.

Jurinea macrocephala Benth.

Synonym ► *J. dolomiacea* Boiss.

Family ► *Compositae; Asteraceae.*

Habitat ► The Himalayas from Kashmir to Kumaon.

Ayurvedic ► Jaatukanda, Gugguluka.

Folk ► Guugal, Dhuup.

Action ► Roots—used as incense. Stimulant, given in colic, also in fever after child birth. Bruised roots are applied to eruptions.

The alcoholic extract of the root inhibits about 50% growth of NK65 strain of *Plasmodium berghei* at a dose of 2 g/kg per day in 4 days.

Jussiaea suffruticosa Linn.

Synonym ► *Ludwigia octovalvis* (Jacq.) Raven.
Oenothera octovalis Jacq.

Family ► *Onagraceae.*

Habitat ► A native of the New World; found in marshy fields in India.

Ayurvedic ► Jala-lavanga, Bhuu-lavanga, Bana-laung.

Siddha/Tamil ► Nirkkrambu.

Action ► Cooling, diuretic, astringent, mild laxative. Used in catarrhal affections of children; applied externally for burns and scalds. Pulp of the plant, steeped in buttermilk, is used for dysentery. Root—febrifuge.

Jussiaea tenella Burm. f.

Synonym ► *J. linifolia* Vahl.
J. fissendocarpa Haines.

Family ► *Onagraceae.*

Habitat ► Watery and swampy places in Bihar and Orissa and in some parts of South India.

Ayurvedic ► Jala-lavanga (var.).

Action ► See *J. suffruticosa.*

An infusion of the root is given in syphilis. The plant is employed in poultice for pimples.

Justicia betonica Linn.

Family ► *Acanthaceae.*

J

Habitat ► Throughout greater parts of India, in waste lands, hedges and rocky ravines.

Siddha/Tamil ► Velimungil.

Folk ► Had-paata (Bihar), Prameha-harati, Mokandar. (Madhya Pradesh).

Action ► Plant—used in diarrhoea; externally for swellings and boils.

Justicia gendarussa Burm. f.

Synonym ► *Gendarussa vulgaris* Nees.

Family ► *Acanthaceae.*

Habitat ► Throughout the greater part of India and Andaman Islands.

Ayurvedic ► Krishna Vaasaa (blue var.), Nila-nirgundi, Krishna-nirgundi, Nila-manjari.

Siddha/Tamil ► Karunochhi, Vadaikkuthi.

Action ► Febrifuge, diaphoretic, emetic, emmenagogue. Infusion of leaves—given internally in cephalalgia, hemiplegia and facial paralysis. Fresh leaves—used topically in oedema and rheumatism. Bark—emetic.

The leaves contain beta-sitosterol, an alkaloid, lupeol, friedelin and aromatic amines.

Justicia procumbens Linn.

Family ► *Acanthaceae.*

Habitat ► Western Ghats, West Coast from Konkan to Kerala; abundant in the rainy season.

Ayurvedic ► Parpata (substitute).

Action ► The plant contains naphthofuranones, justicidin A, B, C, D, G and H, and diphyllin, which are used for the treatment of osteoporosis. The flowers contain peonidine glucoside. Essential oil—antifungal.

Justica tranquebariensis Linn. f.

Family ► *Acanthaceae.*

Habitat ► Deccan, Mysore southwards.

Folk ► Sivanarvembu (Tamil Nadu).

Action ► Leaves—cooling, aperient; given for smallpox to children, bruised leaves applied to contusions.

The alcoholic extract of the aerial parts yielded several lignans, phytosterols, brassicasterol, campesterol, 7,22-ergostadienol, stigmasterol, sitosterol, spinasterol, 28-isofucostil and a sterol glucoside, beta-sitosterol-3-O-glucoside.

Justica vasculosa Wall. (Eastern Himalayas, Assam Khasi Hills) is also used for inflammations.

K

Kadsura heteroclita (Roxb.) Craib.

Synonym ► *K. roxburghiana* Arn. *K. wightiana* Arn.

Family ► *Magnoliaceae.*

Habitat ► Eastern Himalaya, Assam, Western Ghats in Malabar.

Folk ► Pattiamlo, Salado-rik (Himalayas). Kang-mari, Mi-ja-ngew, Theiarbawm (Assam).

Action ► The stems have been used in Chinese folk medicine to promote blood circulation and for the treatment of gastric and duodenal ulcer, acute and chronic gastroenteritis, postpartum abdominal pain and trauma.

The stem contains dibenzocyclo-octadiene type lignans. The plant lignans showed PAF (platelet activating factor) receptor antagonistic activity. The lignans have also been reported to be potent inhibitors of lipid peroxidation in rat liver. The fruit contains gomisin D, which is an active ingredient of an antiulcer agent.

Kaempferia galanga Linn.

Family ► *Zingiberaceae.*

Habitat ► Throughout the plains of India, cultivated in gardens.

English ► Galanga, Maraba.

Ayurvedic ► Sugandha-vachaa, Chandramuula, Chandramuulikaa. (In Kerala, used as Karchura and Shathi.) (Kapurakachari is a different drug, equated with *Hedychium spicatum.*)

Siddha/Tamil ► Kachoram.

Action ► Tuber—stimulant, carminative, expectorant, diuretic used for respiratory ailments like cough, bronchitis and asthma.

The essential oil from rhizomes contain *n*-pentadecane, ethyl-*p*-methoxy cinnamate, ethyl cinnamate, carene, camphene, borneol, *p*-methoxystyrene, *p*-methoxy cinnamate, *p*-methoxy-*trans*-cinnamic acid and cin namaldehyde. Insecticidal activity of the oil is attributed to ethyl cinnamates. Ethyl-*p*-methoxy-cinnamate shows monoamine oxidase inhibitor activity and a cytotoxic principle (the rhizomes exhibit cytotoxic activity).

Leaves and flowers exhibit antiphlogistic and vitamin P activity. Ethyl-*p*-methoxy-*trans* cinnamate is the main compound in the root.

Kaempferia rotunda Linn.

Family ► *Zingiberaceae.*

Habitat ► Throughout India in wet or humid shaded areas.

Ayurvedic ► Bhuumi-champaka, Bhuu-champaka, Hallakam.

Siddha/Tamil ► Karunkuvalai.

Folk ► Bhui-champaa.

Action ► Tuber—antitumour. Used for swellings (removes blood clot), mumps and wounds.

Tubers gave crotepoxide and beta-sitosterol. The oil contained chavicol, cineole.

Kalanchoe integra (Medic.) Kuntze.

Synonym ► *K. brasiliensis* Cambress. *K. spathulata* Roxb.

Family ► *Crassulaceae.*

Habitat ► Tropical Himalayas from Kashmir to Bhutan, on Lushai hills and in the Deccan.

Ayurvedic ► Parnabija (var.).

Unani ► Zakhm-e-Hayaat.

Folk ► Rungru, Tatara. Bakalpattaa, Patkuari (Kumaon). Hathokane (Nepal).

Action ► Plant—hypotensive, antiarrhythmic.

Aqueous extract of the leaves depressed CNS and potentiated barbiturate-induced hypnosis in mice.

The flowers yielded triterpenoids—friedelin, taraxerol and glutinol and a mixture of long chain hydrocarbons, *n*-alkanols and sterols. Kaempferol and its 3-O-rhamnoside, patuletin and patuletin-3, 7-di-O-rhamnoside, quercetin and quercetin-3-O-glucoside-7-O-rhamnoside are reported from leaves and flowers.

The leaves exhibit wound healing properties.

Kalanchoe laciniata (Linn.) DC.

Synonym ► *K. schweinfurthii* Penzig. *Cotyledon laciniata* Roxb.

Family ► *Crassulaceae.*

Habitat ► Maharashtra, Deccan and Bengal.

Ayurvedic ► Parnabija (var.), Vatapatri.

Unani ► Zakhm-e-Hayaat.

Siddha/Tamil ► Malakalli.

Folk ► Hemasaagar.

Action ► Plant—used in fever, dyspepsia, skin allergy, asthma, bronchitis. Leaves—astringent, antiseptic, astringent. Applied to insect bites. Lotions are used for smallpox. Leaf juice is given in diarrhoea, dysentery, lithiasis.

Kalanchoe pinnata (Lam.) Pers.

Synonym ► *Bryophyllum pinnatum* (Lam.) Oken.
B. calycinum Salisb.

Family ► *Crassulaceae.*

Habitat ► Throughout the warm and moist parts of India, especially abundant in West Bengal.

Ayurvedic ► Parnabija, Pattharchuur, Pattharchat, Hemsaagar. (Paashaanabheda is a misleading synonym.)

Unani ► Zakhm-e-Hayaat.

Siddha/Tamil ► Runakalli.

Action ► Leaf—anti-inflammatory, antifungal, antibacterial. Applied to wounds, burns, boils, swellings.

The methanolic extract of leaves exhibited potent anti-inflammatory activity against both exudative and proliferative phases of inflammation. The leaf extract also showed analgesic activity.

The leaves gave flavonoids—quercetin, kaempferol, quercetin-3-diarabinoside and kaempferol-3-glucoside; also *n*-hentriacontane, *n*-tritriacontane, alpha- and beta-amyrin and sitosterol; *p*-coumaric, ferulic, syringic, caffeic and *p*-hydroxybenzoic acids.

Kandelia rheedii Wight & Arn.

Synonym ► *K. candel* (L.) Druce.

Family ► *Rhizophoraceae.*

Habitat ► Costal forests of eastern and western Peninsulas, the Sunderbans (West Bengal).

Siddha/Tamil ► Thuvar kandan.

Folk ► Rasunia (Orissa), Guria (Bengal).

Action ► Bark—used with ginger or long pepper and rose water for diabetes (aqueous or alcoholic extracts of the bark did not exhibit any effect on the blood sugar of normal or alloxan-diabetic rabbits).

The Bark contains 17.3% tannin and 13.5% non-tans. Novel proanthocyanidin dimers and trimers—all containing a phenylpropionoid substituent in the upper flavan unit, along with propelargonidin dimers and procyanidin trimers of common types, have been isolated from the bark.

Kedrostis foetidissima (Jacq.) Cogn.

Synonym ► *K. rostrata* (Rottl.) Cogn. *Bryonia rostrata* Rottl. *Rhynghocarpa foetida* Clarke

Family ► *Cucurbitacease.*

Habitat ► Gujarat, Madhya Pradesh, Maharashtra, Andhra Pradesh and Tamil Nadu.

Folk ► Appakovay (Tamil Nadu). Kukumadona, Nagadonda (Andhra Pradesh) Nurakvel (Maharashtra).

Action ► Root and fruit—demulcent; used in asthma and piles.

Khaya senegalensis A. Juss.

Synonym ► *Melia dubia* Cav.

Family ► *Meliaceae.*

Habitat ► Native to South Africa. Planted in forest nurseries and plantation at Pune and Vada (Maharashtra).

English ► African Mahogany.

Action ► Anti-inflammatory, cardiogenic.

Methanolic extract of the stem bark showed cardiovascular (cardiogenic) effect in rodents by increasing blood pressure and vasoconstriction of the arota partly due to the stimulation of beta-receptors and alpha-adrenoceptors.

Alcoholic extract of the stem bark showed anti-inflammatory activity.

Kigelia pinnata (Jacq.) DC.

Synonym ► *K. africana* (Lam.) Benth.

Family ► *Bignoniaceae.*

Habitat ► Native to West Africa, cultivated as a roadside tree.

English ► Common Sausage tree.

Folk ► Jhaar Phaanuus.

Action ► Bark—antidysenteric, antirheumatic, diuretic. Used in venereal diseases. Fruits—purgative.

The root bark contains monoterpenoids, pinnatal, isopinnatal and isokigelinol napthoquinones.

The fruit gave a cytostatic compound.

In Africa, the root bark is used in the treatment of venereal diseases, haemorrhoids and rheumatism; also as a vermifuge.

K

Kingiodendron pinnatum (Roxb. ex DC.) Harms.

Synonym ► *Hardwickia pinnata* Roxb. ex DC.

Family ► *Caesalpiniaceae.*

Habitat ► Hills of Tamil Nadu, Karnataka and Kerala.

English ► Piney.

Ayurvedic ► Samparni.

Siddha/Tamil ► Kodapalai, Madayansambrani.

Action ► Oleo-gum-resin—used in catarrhal conditions of the genitourinary and respiratory tracts; also for treating sores.

The oleo-gum-resin contains monoterpenes and diterpenes—hardwickiic, kolavic, kolavenic acids and kolavenol.

Kirganelia reticulata (Poir) Baill.

Synonym ► *Phyllanthus reticulatus* Poir.

Family ► *Euphorbiaceae.*

Habitat ► All over India; also grown as a hedge plant.

Ayurvedic ► Kaamboji.

Folk ► Panjuli.

Action ► Plant—spasmolytic, hypotensive, antiviral. Fruit—astringent, used in inflammations. Leaves—astringent, antidiarrhoeal, diuretic. Root bark—astringent, attenuant, diuretic.

The leaves contain beta-sitosterol, friedelin and its derivatives, glochidonol and betulinic acid. Betulin, glochidonol, friedelin, octacosanol, taraxeryl acetate, taraxerone and beta-sitosterol are obtained from the root.

Kleinhovia hospita Linn.

Family ► *Sterculiaceae.*

Habitat ► Grown in Indian gardens and as an avenue tree.

Folk ► Panuitteku (Tamil Nadu). Bol (Bengal).

Action ► Bark and leaves—used in the treatment of cough and tuberculosis.

The roots contain kaempferol, quercetin and rutin.

Knema angustifolia (Roxb.) Warb.

Synonym ► *Myristica gibbosa* Hook. f.

Family ► *Myristicaceae.*

Habitat ► Sikkim Himalayas, Assam.

Folk ► Motaa-pasuti (Assam), Ramguwaa (Nepal).

Action ► Kino—astringent; used for dysentery; topically applied to mouth sores.

Kino contains 33.6% tannin and resembles kino from *Pterocarpus marsupium* is appearance.

Kochia indica Wt.

Family ► *Chenopodiaceae.*

Habitat ► North-western and Peninsular India.

Folk ► Bui-chholi (Punjab). Kauraro.

Action ► Cardiac stimulant.

Resinous alkaloid, isolated from alcoholic extract of the plant, showed nicotinic action on autonomic ganglion and neuromuscular junction of voluntary muscles.

Fruits and leaves of a related sp., *K. scoparia* Schrad are used as a cardiac tonic and diuretic.

Petroleum ether extract of aerial parts contain *n*-alkanes, free alcohols and a mixture of sterols (mainly sitosterol, 70.9%).

The plant exhibits antibacterial activity which is attributed to hydrocarbons and sterols present in it. The plant is also used as an ingredient of a medicinal powder used for dermatitis.

Krameria triandra Ruiz & Pav.

Family ► *Krameriaceae.*

Habitat ► Peru, Bolivia. Reported to be imported into India.

English ► Peruvian Rhatany, Krameria.

Action ► Astringent, styptic, antidiarrhoeal, vulnerary. Used for menorrhagia; topically for wounds, haemorrhoids and chilblains; as a lozenge, gargle or mouthwash for gingivitis and pharyngitis.

Key application ► For topical treatment of mild inflammations of oral and pharyngeal mucosa. (*German Commission E.*)

The astringency of the drug is due to condensed tannins composed of procyanidins and propelargondins.

In India, the roots of *Hemidesmus indicus* are sometimes used as a substitute for Rhatany.

Kydia calycina Roxb.

Family ► *Malvaceae.*

Habitat ► Common in sub-Himalayan tract.

Folk ► Pola, Pulu, Pula, Polao. Vendi (Tamil Nadu). Potri, Konda Potari, Pandiki, Pachabotuka (Andhra

Pradesh). Velukku, Venta, Nedunar (Kerala).

Action ► Plant—mucilaginous, anti-inflammatory, febrifuge. Leaf and root—antirheumatic. The leaves stimulate saliva. A paste of leaves is applied in body pains, used in poultices for skin diseases.

Kyllinga triceps Rottb.

Synonym ► *K. tenuifolia* Stend. *Cyperus triceps* (Rottb.) Endl.

Family ► *Cyperaceae.*

Habitat ► Northwestern India, Gujarat, Rajasthan and South India.

Ayurvedic ► Nirvishaa (var.) Mustaka (var.), Apivisha.

Folk ► Mustu (Maharashtra).

Action ► Root—febrifuge and antidermatosis. Also used for diabetes.

Kyllinga monocephala Rottb., synonym *Cyperus kyllinga* Endl., common throughout India, is also known as Nirvishaa, Nirbishi and Mustaa (var.). The root is used as diuretic (in polyuria), demulcent, refrigerant and antipyretic. It is prescribed for fistula, pustules, tumours, measles, diarrhoea and other intestinal affections.

Traces of hydrocyanic acid are reported to be present in the root, stems and nutlets.

L

Lactuca runcinata DC.

Synonym ► *L. heyneana* DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Many parts of India, as a common weed.

Folk ► Undir-chaa-kaan (Maharashtra).

Action ► Diuretic, slightly aperient. Used as a diuretic in calculous affections, also for chronic obstruction of liver and bowels.

A smaller var., found in western Uttar Pradesh, Rajasthan, Saurashtra and the Deccan Penninsula, is equated with *L. remotiflora* DC.

Lactuca sativa Linn.

Synonym ► *L. scariola* Linn. var. *sativa* C.B. Clarke.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Southern and West Asia. Cultivated throughout India as a cold weather crop.

English ► Garden Lettuce.

Unani ► Kaahuu Bustaani, Salaad Pattaa, Salaad Baaghi.

Siddha/Tamil ► Salattu.

Action ► Plant—used in painful ulcers and burns.

The leaves contain calcium, phosphorus, iron, thiamine, riboflavin, niacin, carotine, iodine, fluorine. A. dietary allowance of 10 g of lettuce is adequate to meet the vitamin K requirement of the body.

Aqueous extract of roots gave a guaiene-type sesquiterpene glycoside, lactoside C, along with known glycosides, lactoside A and macro-cliniside A.

Lactuca serriola Linn.

Synonym ► *L. scariola* Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► The Western Himalayas, between 1,800 and 3,300 m. Found wild.

English ► Wild Lettuce, Prickly Lettuce.

Ayurvedic ► Salaad, Vanya-Kaahuu.

Unani ► Kaahuu Saharai, Kaahuu Barri.

Siddha/Tamil ► Salattu.

Action ► Plant—mild sedative, diuretic, diaphoretic, expectorant, antiseptic. Seed—demulcent. The seeds are used in the form of powder for coughs and as a decoction for insomnia.

Seeds contain protein, amino acids; Mg Al and K as major elements besides Na, Ca, Si, Ti, Mn, Fe and Cu.

Arachidic, caproic, linoleic, oleic, palmitic, stearic acids and sitosterol (from the root); ascorbic acid, beta-carotene, 8-deoxylactucin, lacticin, jacquilenin, lactupicrin, ubiqui-

none (from the plant) have been isolated.

Lactuca virosa Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Europe. Imported into India.

English ► Bitter Lettuce, Wild Lettuce.

Unani ► Kaahuu Sahrai (var.), Kaahuu Barri (var.).

Action ► Mild sedative, hypnotic, (once used as a substitute for opium), anodyne, expectorant.

Key application ► As sedative. (*The British Herbal Pharmacopoeia.*)

Used in insomnia, nervous excitability, anxiety, restlessness, hyperactivity in children, nymphomania, smoker's cough, irritable cough and bronchitis.

Aerial parts contain sesquiterpene glycosides.

The leaves and dried juice contain lacticin, lactucopicrin (sesquiterpene lactones); flavonoids (mainly based on quercetin); coumarins (cichoriin and aesculin); N-methyl-beta-phenethylamine; triterpenes include taraxasterol and beta-amyrin. The sesquiterpene lactones have a sedative effect.

The Wild Lettuce also contains hyoscyamine, while the dried sap is devoid of it. Morphine content has been found in low concentrations, too low to have pharmacological effect. (*Natural Medicines Comprehensive Database,* 2007.)

The oil of seeds is used for arteriosclerosis.

Lagenaria siceraria (Mol.) Standl.

Synonym ► *L. vulgaris* Ser.
L. leucanth Rusby.
Cucurbita siceraria Mol.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India.

English ► Bitter Bottle-Gourd.

Ayurvedic ► Katu-tumbi, Tumbini, Ikshavaaku. Tiktaalaavu, Pindaphalaa.

Unani ► Kaddu-e-talkh (bitter var.).

Siddha/Tamil ► Suraikai.

Action ► Pulp—purgative, emetic. Leaf—used in jaundice.

Cucurbita lagenaria Linn. is equated with Lauki or Sweet Bottle-Guard, used all over India as a vegetable.

Cucurbita siceraria Mol. is equated with Titalauki or the Bitter Bottle-Gourd. Bitter fruits yield 0.013% of a solid foam containing cucurbitacin B,D,G and H, mainly cucurbitacin B. These bitter principles are present in the fruit as aglycones. Leaves contain cucurbitacin B, and roots cucurbitacins B, D and traces of E. The fruit juice contains beta-glycosidase (elaterase).

Plants which yield non-bitter fruits contain no bitter principles or elaterase; their roots are not bitter.

Lagerstroemia flos-reginae Retz.

Synonym ► *L. speciosa* (L.) Pers.
L. reginae Roxb.

Family ► *Lythraceae.*

Habitat ► Tropical Himalaya, and Assam, Western and Eastern Ghats, up to 1,000 m.

English ► Pride of India, Queen's Flowers, Queen Crape Myrtle.

Siddha/Tamil ► Kadalai, Pumaruttu.

Folk ► Jaarul. Kramuk and Arjun are confusing synonyms.

Action ► Seed—narcotic. Root—astringent, stimulant, febrifuge. Fruit—used for aphthae of the mouth. Leaves—purgative, diuretic, deobstruent. Bark—an infusion is given in diarrhoea and abdominal pain.

A decoction of the leaves, also of dried fruits, is used like tea for diabetes mellitus in Philippines. Mature leaves and fruits, in fresh condition, exhibit hypoglycaemic activity experimentally. The potency decreases on storing the material.

The leaf extract, when administered as powder and as tannin-free extract, showed hypoglycaemic activity in mice. Amino acids constitute the insulin-like principle. The plant contains triterpenoids, colocolic acid and maslinic acid. Colocolic acid is known to possess hypoglycaemic activity.

Leaves contain lageracetal and sitosterol. Ellagitannins have been isolated from fruits and leaves.

Lagerstroemia indica Linn.

Family ► *Lythraceae.*

Habitat ► Native to China; grown as an ornamental.

English ► Common Crape Myrtle.

Siddha/Tamil ► Pavalak-kurinji, Sinappu.

Folk ► Saavani, Faraash.

Action ► Seed—narcotic. Bark—stimulant, febrifuge. Leaves and flowers—purgative. Root—astringent. Used as a gargle.

Lagerstroemia parviflora Roxb.

Family ► *Lythraceae.*

Habitat ► Almost throughout India, up to an altitude of 900 m, in the Himalayas.

Ayurvedic ► Siddhaka, Siddha, Syandana (provisional synonym).

Folk ► Dhauraa, Bakli. Chungi (Hyderabad). Lendia (trade).

Action ► Astringent, fungitoxic.

The bark and leaves contain tannin 7–10 and 16% respectively. The plant contains a pentacyclic triterpene, lagflorin. Aqueous extract of fresh and ethanolic extract of dried and powdered leaves exhibit fungitoxic activity against several fungal pathogens of rice.

Laggera alata Sch.- Bip. ex Oliver.

Family ► *Asteraceae, Compositae.*

Habitat ► Throughout India, ascending up to 2,100 m in the hills. (Native to tropical Africa and Madagascar.)

English ► False Tobacco.

Folk ► Amadok (Garhwal).

Action ► Disinfectant.

The plant is one of the major ingredients of an ointment used in the treatment of skin tumours in Chinese medicine. In Ivory Coast, Burkina Faso, Gabon and Tanganyika, different parts of the plant are used for the treatment of intercostal pain, rheumatic pain and fever. The leaf and root decoctions are used to treat pneumonia.

The plant from Nigeria was found rich in phenolic ethers (45%), followed by monoterpenes (22%) and sesquiterpenes (12%). The major component of the oil was dimethyl thymoquinone (44%). It showed activity against Gram-positive microorganisms. Dried powder of the plant contained artemisetin (artemetin).

L

Lallemantia royleana Roxb.

Family ► *Labiatae.*

Habitat ► Plain and hills of Kumaon and Punjab, extending westwards to Afghanistan. Imported into India from Persia.

Unani ► Baalango, Tukhm-e-Baalango.

Folk ► Tuut-malangaa.

Action ► Seed—cooling, diuretic, sedative; given internally as a soothing agent during urinary troubles, also for cough. A poultice of seeds is applied to abscesses, boils and inflammations. (Seeds are not to be used as a substitute for *Plantago* sp.)

Seeds contain linoleic, oleic, palmitic and stearic acids; beta-sitosterol. Gum contains L-arabinose, D-galactose, L-rhamnose, pentosans, protein, uronic anhydride. Amino acids are also found in the plant.

Lamium album Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► West Himalayas from Kashmir to Kumaon.

English ► White Dead Nettle, Archangel.

Action ► Haemostatic (particularly on the uterus), astringent, diuretic, anti-inflammatory, antispasmodic, expectorant. Used for menorrhagia, leucorrhoea, cystitis, prostatitis, bleeding piles, diarrhoea, irritable bowel and respiratory catarrh.

Key application ► Internally, for catarrh of the upper respiratory passages; externally, for mild, superficial inflammation of the skin. (*German Commission E.*) Flowers have been recommended for teas and other galenical preparations for internal applications, rinses, baths and moist compresses. As astringent. (*The British Herbal Pharmacopoeia.*)

The herb contains iridoid monoterpenes; triterpene saponins; caffeic acid derivatives; flavonoids based on kaempferol; tannins (mainly catechins). The plant also gave a carbocyclic iridoid, caryoptoside; besides lambalbide, albosides A and B (iridoid monoterpenes).

Laminum amplexicaule Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► The temperate Himalayas from Kashmir to Kumaon, Sikkim and Assam.

Folk ► Titpaati (Garhwal), Jipachi (Tibbet).

Action ► Plant—stimulant, laxative, diaphoretic, cephalic, antirheumatic.

Lamprachaenium microcephalum Benth.

Family ► *Compositae; Asteraceae.*

Habitat ► Deccan, Konkan and Karnataka.

Unani ► Brahmdandi. (*Tricholepis angustifolia* DC. of the same family has also been equated with Brahmdandi in *National Formulary of Unani Medicine.*)

Folk ► Brahmdandi (Maharashtra), Ajadandi.

Action ► Antiseptic, bitter tonic.

Lannea coromandelica (Houtt.) Merrill.

Synonym ► *L. grandis* (Dennst.) Engl.;
Odina wodier Roxb.

Family ► *Anacardiaceae.*

Habitat ► Throughout India, ascending to 1,500 m in the Himalayas.

Ayurvedic ► Jingini, Jhingan, Gudamanjari.

Siddha/Tamil ► Kalasan, Anaikkarai, Odiyan.

Action ► Bark—stimulant and astringent; used in gout; decoction for aphthae of the mouth and for toothache. Leaves— boiled and applied to sprains, bruises, local swellings, elephantiasis. Gum—given in asthma; as a cordial to women during lactation.

The roots contain cluytyl ferulate; heartwood gave lanosterol; bark, *dl-epi*-catechin and (+)-leucocyanidin; flowers and leaves, ellagic acid, quercetin and quercetin-3-arabinoside. Flowers also contain *iso*-quercetin and morin. Leaves in addition contain beta-sitosterol, leucocyanidin and leucodelphinidin.

Lansium domesticum Correa.

Family ► *Meliaceae.*

Habitat ► Cultivated in Nilgiris and a few other places in South India.

En ► glishLangsat Fruit, Dockoa.

Folk ► Duku.

Action ► Bark—astringent, antidysenteric. Resin—antidiarrhoeal, prescribed in intestinal spasm. Seed—febrifuge, vermifuge.

The peel of the fruit contains a triterpenoid acid (lansic acid). Seeds are bitter; contain traces of an alkaloid and resin.

The crude extract of fruit peel, containing lansic acid, lansioside A, B and

C or their derivatives, is used as an ingredient of shampoos and hair tonics.

Lantana camara Linn. var. **aculeata** Moldenke.

Synonym ► *L. aculeata* L.

Family ► *Verbenaceae.*

Habitat ► Native to tropical America; naturalized and occurs throughout India. Also grown as hedge plant.

English ► Lantana, Wild Sage, Surinam Tea Plant.

L

Ayurvedic ► Chaturaangi, Vanachchhedi.

Siddha/Tamil ► Unnichedi.

Folk ► Ghaaneri (Maharashtra).

Action ► Plant—antirheumatic, antimalarial; used in tetanus and ataxy of abdominal viscera. Pounded leaves are applied to cuts, ulcers and swellings; a decoction of leaves and fruits is used as a lotion for wounds.

The plant is considered poisonous. The leaves contain toxic principles, lantadenes A and B, which cause acute photosensitization, jaundice, kidney and liver lesions. A steroid, lancamarone, is cardioactive and fish poison.

The bark of stems and roots contain a quinine-like alkaloid, lantanine. The extract of the shoot showed antibacterial activity against *E. coli* and *Micrococcus pyogenes* var. *aureus.* Flowers contain anthocyanin.

Laportea crenulata Gaudich.

Family ► *Urticaceae.*

Habitat ► Tropical Himalayas from Nepal eastwards, Bihar, Chota Nagpur, Bengal, Assam, Anaimalai Hills and Western Ghats in Kerala.

English ► Devil Nettle, Fever Nettle.

Siddha/Tamil ► Perunkanchori.

Folk ► Utigun, Chorpaat (Bengal). (Uttangan is equated with *Blepharis edulis* Pers.)

Action ► Root—juice used in chronic fevers. Roots and leaves are applied to swellings and abscesses.

Larix griffithiana Carr.

Synonym ► *L. griffithii* Hook. f. & Thoms.

Family ► *Pinaceae.*

Habitat ► The Himalayas from eastern Nepal to Bhutan at altitudes of 2,400–3,600 m.

English ► Himalayan Larch, Sikkim Larch.

Folk ► Boargasella, Binyi (Nepal).

Action ► Balsam—antiseptic, hypermic.

Key application ► *Larix decidua* Miller—in rheumatic and neuralgic discomforts, catarrhal diseases of the respiratory tract, furuncle (in the form of ointments, gels, emulsions and oils). (*German Commission E.*)

American Larch is equated with *Larix laricina* Koch., synonym *L. americana* Michx. It is known as Tamarac.

European Larch is equated with *Larix decidua* Miller., synonym *L. europea* DC., *Pinus larix* L., *Abies larix*. It is known as Pine Larch.

The bark of American Larch contains 2–15% tannins. The bark of *Larix dedidua* is also astringent, balsamic and diuretic. It contains lignans; lariciresinol, liovil and secoisolariciresinol; 60–80% resins; essential oil, containing alpha- and beta-pinene, limonene, phellandrene, borneol as major constituents.

Lasia spinosa (L.) Thw.

Synonym ► *Lasia aculeata* Linn.

Family ► *Araceae.*

Habitat ► Tropical Sikkim Himalayas, Assam, Bengal and Southwards to Sri Lanka.

Siddha ► Kantakachoramu, Mulasari (Telugu.)

Folk ► Kantakachu (Bengal), Kaantaasaru. Lakshmanaa and Indiver-kand are doubtful synonyms.

Action ► Plant—used for colic and intestinal diseases. Leaves—used for stomachache. Rootstock and fruits—for affections of the throat.

Lasiosiphon eriocephalus Decne.

Family ► *Thymelaceaceae.*

Habitat ► Deccan and Western Ghats, from Konkan southwards to Kerala at altitudes of 1,200–2,500 m.

Siddha ► Nachinaar (Tamil).

Folk ► Raamethaa (Maharashtra).

Action ► Bark and leaves—poisonous. Plant—vesicant. Leaves are applied to swellings and contusions.

The stem bark and seeds contain a xanthone glycoside, lasioside and a biscoumarin, lasiocephatin.

Lathyrus sativus Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Cultivated chiefly in Madhya Pradesh, Eastern Uttar Pradesh, West Bengal, Andhra Pradesh and Gujarat.

English ► Chickling Vetch, Grass Pea.

Folk ► Khesaari, Latari, Kalaaya.

Action ► Seeds—toxic. Prolonged consumption results in paralysis of legs, both in animals and human beings, known as lathyrism. The toxic substance responsible for lathyrism had been identified as selenium. Peritoneal injection of beta-N-oxalylaminoalanine (isolated from the seeds) produced acute neurolathyrism at LD50 doses (748.8 mg/kg) in mice and (694.9 mg/kg) in chicken; liver and kidney cells showed denaturation, vacuolar and fatty degeneration. (It is a neuropoison, which mainly affects central nervous system.)

Related species include, *Lathyrus aphaca* Linn., *L. sphaericus* Retz. and *L. tingitanus* Linn., known as Kalaaya or Khesaari.

L

Launaea mucronata (Forsk.) Muschler.

Synonym ► *L. chondrilloides* Hook. f.

Family ► *Compositae; Asteraceae.*

Habitat ► Western India, Punjab and Sind.

Folk ► Dudh-phad (Rajasthan).

Action ► Plant—galactagogue. A decoction is administered in constipation.

Launaea pinnatifida Cass.

Synonym ► *L. sarmentosa* (Willd.) Alston.

Family ► *Compositae; Asteraceae.*

Habitat ► Sandy coasts of India.

Ayurvedic ► Gojihvaa, Golomikaa. (Gaozabaan, used in Unani medicine, is equated with *Boraginaceae* sp.)

Folk ► Vana-gobhi; Paathri (Maharashtra).

Action ► Plant—galactagogue, soporific, diuretic, aperient.

Laurus nobilis Linn.

Family ► *Lauraceae.*

Habitat ► Native to the Mediterranean region; cultivated throughout India.

English ► Laurel, Sweet Bay.

Unani ► Habb-ul-Ghaar, Daphni.

Action ► Leaves—mild sedative, gastric tonic, cholagogue, diaphoretic, antiseptic, antifungal. Used as a gargle against sore throat. Oil—used externally for rheumatism and in hair dressings for dandruff. Berry—emmenagogue, antileucorrhoeic, antidiarrhoeal.

Fresh leaves from Lahore (Pakistan) gave an essential oil (0.3–0.36%) with, 1,8-cineole 42.2, eugenol 16.4, sabinene 6.5, alpha terpineol 1.6, alpha-pinene 3.4, methyl eugenol 2.4 and terpinolene 1.9%. Major components of Greek and Russian oils were 1,8-cineole followed by alpha-terpinyl acetate.

The fruit from Kumaon region gave an essential oil (5%), including among others, 1,8-cineol (28.4), methyl cinnamate (20.1), alpha phellandrene (10.1) and alpha-pinene (9.3%).

The leaves contain sesquiterpene lactones and isoquinoline alkaloids. Ethanolic extract of leaves produces a significant decrease in blood glucose level of diabetic rabbits. It contains amylase inhibitors which can supress sugar metabolism and can be used as an antiobesity agent for pet animals.

The leaf extract has been used as an antidandruff solution.

Lavandula angustifolia Mill.

Synonym ► *L. officinalis* Chaix. *L. spica* Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to Mediterranean region; cultivated in Jammu and Kashmir.

English ► Lavender.

Action ► Herb—mildly sedative, antiflatulent and cholagogue. Essential oil—antiseptic, antibacterial, antispasmodic.

Key application ► Internally, for mood disturbances, such as restlessness or insomnia; functional abdominal complaints (nervous stomach irritation and discomfort); for the treatment of functional circulatory disorders in balneotherapy. (*German Commission E.*) *The Ayurvedic Pharmacopoeia of India* indicates the use of *Lavandula* sp. for depressive states associated with digestive dysfunction.

Major constituents of the essential oil are linalool and linalyl acetate. Others include borneol, camphor, lavandulyl, caryophyllene, limonene, beta-ocimene, terpene-4-ol-and alpha-terpineol.

Aerial parts of the plant contains ursolic acid lactone, betulin, betulinic acid and 3 beta-formyl ursolic acid. The essential oil from flowering shoots showed neuro-depressive or anxiolytic activity in albino rats.

Lavandula bipinnata Kuntze.

Synonym ► *L. burmanni* Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Bihar, Chota Nagpur, Orissa, Madhya Pradesh, Rajasthan, Maharashtra, Decan and Konkan southwards to Kerala.

English ► Wild Lavender.

Ayurvedic ► Shankhapushpi (Gujarat).

Action ► Used as a substitute for *Convolvulus pluricaulas* Choisy.

Lavandula stoechas Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Mediterranean region and Asia Minor. Dried plant and flowers are imported into Mumbai from Persian Gulf.

English ► Arabian or French Lavender.

Unani ► Ustukhuddus, Alfaajan.

Folk ► Dhaaru.

Action ► Flowers—antidepressive, sedative, anticonvulsant, carminative, antispasmodic, antibacterial, antiseptic. Used in depression, nervous headache, sluggish circulation, physical and mental exhaustion, insomnia, epilepsy, neuralgia and rheumatic affections.

Oil—rubefacient, antimicrobial. Used for nervous palpitations, giddiness, spasm and colic. Relieves sprains, neuralgia and rheumatism; rubbed for stimulating paralysed limbs. Applied to sores, burns, scalds and varicose veins.

Plant—used for the treatment of epilepsy and chronic sinusitis in Unani medicine.

Aerial parts of the plant contain oleanolic, ursolic and vergatic acid, beta-sitosterol, alpha-amyrin and its acetate, lupeol, erythrodiol, luteolin, acacetin and vitexin.

The leaves contain polyphenols, apigenin-7-O-beta-D-glucoside, luteolin and its 7-O-beta-D-glucoside, and 7-O-beta-D-glucuronide, rosmarinic acid, and 6-O-caffeoyl glucose.

For depression, tincture of lavender flower (1 : 5 in 50% alcohol), 60 drops per day, has been used for 4 weeks in Western herbal. (*Natural Medicines Comprehensive Database,* 2007.)

Lawsonia inermis Linn.

Family ► *Lythraceae.*

Habitat ► Native to Arabia and Persia; now cultivated mainly in Haryana and Gujarat; to a small extent in Madhya Pradesh and Rajasthan.

English ► Henna.

Ayurvedic ► Madayanti, Madayantikaa, Mendika, Ranjaka.

Unani ► Hinaa, Mehndi.

Siddha/Tamil ► Marithondi, Marudum.

Action ► Leaves—astringent, antihaemorrhagic, antispasmodic, oxytocic, antifertility, antifungal, antibacterial. Used externally to treat skin infections (tinea); also as a hair conditioner.

The Ayurvedic Pharmacopoeia of India indicated the use of the leaves in dysuria, jaundice, bleeding disorders, ulcers, prurigo and other obstinate skin diseases. The leaf is also recommended in giddiness and vertigo.

The leaves contain naphthoquinones, in particular lawsone; coumarins (laxanthone, I, II and III); flavonoids, luteolin and its 7-O-glucoside, acacetin-7-O-glucoside; beta-sitosterol-3-O-glucoside; all parts contain tannins.

Chloroform and ethanol extracts of leaves exhibit promising antibacterial activity against *Shigella* and *Vibrio cholerae.* Leaf extract shows antifungal activity against several pathogenic bacteria and fungi.

Henna paint is used as a medicament for treatment of hands and feet for mycosis. The antimycotic activity is due to lawsone, a naphthoquinone.

The ethanol-water (1 : 1) extract of the stem bark shows hepatoprotective activity CCl4-induced liver toxicity. Stem bark and root, probably due to the presence of isoplumbagin and lawsaritol, exhibit anti-inflammatory activity experimentally.

Evidence shows Henna leaf might be able to decrease the formation of sickled cells in individuals with sickle cell anaemia. (*Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Leaves—5–10 ml juice. (*API,* Vol. IV.)

Leea aequata Linn.

Synonym ► *L. hirta* Roxb. ex Hornem.

Family ► *Vitaceae.*

Habitat ► Northern Eastern India, West Peninsula and the Andamans.

Ayurvedic ► Kaakajanghaa, Nadikaantaa, Sulomaasha, Paaraavatapaadi.

Folk ▶ Surapadi (Telugu).

Action ▶ Stem and root—astringent, anthelmintic. Used for indigestion, jaundice, chronic fever and malaria. Essential oil—inhibits the growth of *Mycobacterium tuberculosis* (Schroeter) Lehmann & Neumann; also inhibits the growth of *Micrococcus pyogenes* var. *aureus* and *Pasteurella pestis.* Root, tuber and stem—mucilaginous, astringent. Leaves and twigs—antiseptic; used for poulticing wounds.

Leea crispa Linn.

Family ▶ *Vitaceae.*

Habitat ▶ North-Eastern India and in Western parts of Deccan Peninsula.

Folk ▶ Banachelt (Maharashtra), Banachalit (Bengal), Nalugu, Nellu (Kerala).

Action ▶ Leaves—applied to wounds. Root tubers—used for guineaworm. Plant—a host of the Indian lac insect.

Leea indica Merrill.

Family ▶ *Vitaceae.*

Habitat ▶ Forests of tropical and subtropical India, from Himalayas as far west as Kumaon, and southwards to the Peninsula.

Ayurvedic ▶ Chhatri, Karkatajihvaa, Kukurjihvaa.

Siddha/Tamil ▶ Nalava, Nyekki, Ottanali.

Folk ▶ Karkani (Maharashtra).

Action ▶ Root—antidiarrhoeal, antidysenteric, antispasmodic, cooling, sudorific. A decoction allays thirst. Leaves—juice of young leaves, digestive. Ointment prepared from roasted leaves relieves vertigo.

The leaves contain amorphous froth forming acid.

Leea macrophylla Roxb.

Family ▶ *Vitaceae.*

Habitat ▶ Throughout hotter parts of India.

Ayurvedic ▶ Hastikanda, Hasti-karna Palaasha; Kekidandaa.

Folk ▶ Hatkan, Dholsamudra, Haath, Kaan.

Action ▶ Astringent, anodyne, styptic, antiseptic. Root tubers—astringent, mucilaginous; applied to wounds and sores; used for ringworm and guineaworm.

Lens culinaris Medic.

Synonym ▶ *L. esculenta* Moench.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Native to South West Asia; cultivated as a pulse crop mainly in North India, Madhya Pradesh and some parts of Maharashtra.

English ▶ Lentil.

Ayurvedic ▶ Masura, Masurikaa, Mangalyaa, Mangalyak, Adaasa.

Unani ▶ Masoor.

Siddha ► Misurpurpu.

Action ► Seeds—mostly used as a pulse. Contain as much as 30% proteins (similar to those of peas and beans). Soup is used in gastric troubles and constipation. Paste or poultice is applied to foul and indolent ulcers.

Dosage ► Dried seed—10–20 g. (*API,* Vol. III.)

Leonotis nepetaefolia (L.) R. Br.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Throughout the warmer parts of India.

Ayurvedic ► Granthiparni, Kaaka-puchha.

Folk ► Gathivan, Deepamaal (Maharashtra).

Action ► Leaves—spasmolytic. Ash of flower head—applied to burns and scalds, in ringworm and other skin diseases.

The Ayurvedic Pharmacopoeia of India recommends the root in cough, bronchitis and dyspnoea.

The root contains *n*-octacosanol, *n*-octacosanoic acid, quercetin, 4,6,7-trimethoxy-5-methylchromene-2-one, campesterol and beta-sitosterol-beta-D-glucopyranoside.

The plant contains 4,6,7-trimethoxy-5-methyl-chromene-2-one.

The leaves contain neptaefolin, neptaefuran, neptaefuranol, neptaefolinol, leonitin, neptaefolinin and (–)-55, 6-octadecadienoic acid.

The seed oil contains oleic, linoleic, palmitic and stearic acids. The fatty oil, extracted from the seeds, is similar to olive oil. The seeds possess feeble antimalarial activity. The seed extract showed 100% toxicity against *Alternaria alternata* and marked toxicity against *Aspergillus niger.*

Dosage ► Root—5–10 g powder. (*API,* Vol. IV.)

Leonurus cardiaca Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to Europe; also distributed in Himalayas from Kashmir to Kumaon.

English ► Common Motherwort, Lion's Tail.

Unani ► Baranjaasif. (Also equated with *Artemesia vulgaris* Linn; and *Achillea millifolium* Linn.)

Action ► Stomachic, laxative, antispasmodic, diaphoretic, emmenagogue (used in absent or painful menstruation, premenstrual tension, menopausal flushes). Hypnotic, sedative. Used as a cardiac tonic. (Studies in China have shown that Motherwort extracts show antiplatelet aggregation actions and decrease the levels of blood lipids.)

Key application ► In nervous cardiac disorders and as adjuvant for thyroid hyperfunction. (*German Commission E.*) As antispasmodic. (*The British Herbal Pharmacopoeia.*) *The British Herbal Compendium* indicated its use for patients who have neuropathic cardiac disorders and cardiac complaints of nervous origin.

The plant contains diterpene bitter principles, iridoid monoterpenes, flavonoids including rutin and quercitrin, leonurin, betaine, caffeic acid derivatives, tannins and traces of a volatile oil.

The herb is a slow acting adjuvant in functional and neurogenic heart diseases. Its sedative and spasmolytic properties combine well with *Valeriana officinalis* or other cardioactive substances.

The herb contains several components with sedative effects—alpha-pinene, benzaldehyde, caryophyllene, limonene and oleanolic acid. (Sharon M. Herr.)

Lepidagathis trinervis Nees.

Family ► *Acanthaceae.*

Habitat ► North-west Himalayas and Sikkim and from Bihar to central, western and southern India.

Folk ► Safed Raasnaa (Bihar). Hiran-chaaro, Paniru (Gujarat).

Action ► Plant—bitter tonic. Used for rheumatic affections. (Raasnaa is equated with *Pluchea lanceolata*.)

Related species of Lepidagathis: *L. cristata* Willd., and *L. hamiltoniana* Wall. ex Nees. These are used as a bitter tonic in fevers and are applied to itchy affections of the skin. The leaves of *L. incurva* D. Don, synonym*L. hyalina* Nees are chewed to relieve cough.

Lepidium iberis Linn. var. alba.

Family ► *Curciferace; Brassicaceae.*

Habitat ► Western Europe. Seeds are imported into India from Persia.

English ► Pepper-Grass.

Unani ► Bazr-ul-khumkhum, Todari (white var.).

Action ► Seeds—blood purifier; prescribed in bronchitis.

The fatty acid of the oil are: oleic 12.9, linoleic 47.87, linolenic 5.43, erucic 31.97, stearic 0.54 and palmitic 1.22%.

The seed mucilage on hydrolysis gave galactose, arabinose, rhamnose and galacturonic acid.

Flowering tops and seeds contain a bitter principle, lepidin.

The plant yield a sulphur-containing volatile oil.

Lepidium latifolium Linn.

Family ► *Curciferace; Brassicaceae.*

Habitat ► North-West Himalayas.

Folk ► Gonyuch (Ladakh).

Action ► Plant—depurative, antilithic, diuretic, stomachic, antiscorbutic. An infusion is given for liver and kidney diseases. Also used as a resolvent in skin affections.

The leaves show dose-dependent increase of diuretic activity; also increase in potassium excretion in urine.

The leaves contain cholesterol, stigmasterol and beta-sitosterol.

Lepidium ruderale Linn.

Family ► *Curciferace; Brassicaceae.*

Habitat ► Bhutan, Kumaon and Kashmir, at altitudes of 2,100–3,900 m.

Action ► Plant—used in impetigo.

The herb, seeds and volatile oil exhibit properties similar to those of other *Lepidium* sp.

Aqueous extracts of the herb cause a brief drop in blood pressure and depress respiration in mice and rabbits.

Lepidium sativum Linn.

Family ► *Curciferace, Brassicaceae.*

Habitat ► Native to West Asia; cultivated throughout India as a salad plant.

English ► Garden Cress, Water Cress.

Ayurvedic ► Chandrashuura, Chandrikaa, Vaas-pushpaa, Pashumehankaarikaa, Nandini, Suvaasaraa, Aashaalim.

Unani ► Habb-ul-rashaad, Tukh-e-Taratezak, Haalim, Sipandaan.

Siddha/Tamil ► Alivirai.

Action ► Used in asthma, bronchial affections and bleeding piles. Seeds—lactagogue, diuretic, and emmenagogue. Used for treating skin disorders, fever, amoebic dysentery and asthma. Leaf—stimulant, antiscorbutic, diuretic. Roots—used in secondary syphilis and in tenesmus.

The Ayurvedic Pharmacopoeia of India recommends the use of dried seeds, in powder form, in gout.

The seeds are a good source of iron, but its bioavailability is poor (5.4% of total iron). They are used for rapid healing of bone fractures. The ethanolic extract of seeds significantly increased collagen synthesis and its deposition at bone fracture portion in the treated rats. The tensile strength of the broken tibiae also increased.

The seeds contain an alkaloid (0.19%), glucotropaeolin, sinapin (choline ester of sinapic acid), sinapic acid, mucilaginous matter (5%) and uric acid (0.108 g/kg). The seed oil exhibits pronounced oestrogenic activity.

The seed mucilage allays the irritation of the mucous membrane of intestines in dysentery and diarrhoea. It consists of a mixture of cellulose (18.3%) and uronic acid-containing polysaccharides; acid hydrolysis yield L-arabinose, D-galactose, L-rhamnose, D-glacturonic acid and D-glucose.

The plant contains pantothenic acid, pyridoxin and rutin. Ethanolic extract of the plant showed antiviral activity against rinderpest virus.

Dosage ► Seed—3–6 g powder. (*API,* Vol. I.)

Leptadenia reticulata W. & A.

Family ► *Asclepiadaceae.*

Habitat ► Sub-Himalayan tracts of Punjab and Uttar Pradesh and Deccan Peninsula up to an altitude of 900 m.

Ayurvedic ► Jivanti; Jivaniya, Jivapushpa, Hemavati, Jivana. Shaakashreshtha, Payaswini, Maangalya, Madhusravaa. (Guduuchi, Medaa, Kaakoli and Vrkshaadani are also known as Jivanti.) (Haimavati

is equated with Orris Root and Hemapushpa with *Sarca asoca* flower.)

Siddha/Tamil ► Keerippaalai.

Folk ► Dodishaak (Gujarat).

Action ► Plant—stimulant and restorative. Improves eyesight. Found useful in the treatment of habitual abortion. Leaves and roots used in skin diseases.

The herb contains *n*-triacontane, cetyl alcohol, beta-sitosterol, beta-amyrin acetate, lupanol 3-O-diglucoside and lepitidin glycoside.

Stigmasterol and lipoid fraction of the plant exhibited estrogen mimetic effects.

Alcoholic extract of roots and leaves show antibacterial activity against Gram-positive and Gram-negative bacteria.

Intravenous administration of aqueous extract of stems has a pronounced and hypotensive action in anaesthetized dogs.

Dosage ► Root—3–6 g powder. (*CCRAS.*)

Leptadenia spartium Wight.

Synonym ► *L. pyrotechnica* (Forsk.) Decne.

Family ► *Asclepiadaeae.*

Habitat ► Punjab, Western Uttar Pradesh, Rajasthan and northern parts of Mumbai along the sea coast.

Folk ► Kheemp (Rajasthan), Kheep (Gujarat). Prasaarani is a doubtful synonym.

Action ► Antiseptic. Plant used for the treatment of burns and wounds.

The plant contains a triterpenoid, leptadenol; also 2.32 g/100 g tannin.

Lettsomia elliptica Wight.

Synonym ► *Argyreia elliptica* (Wight) Choisy.

Family ► *Convolvulaceae.*

Habitat ► Chota Nagpur, Orissa, Deccan, Karnataka, Anaimalai Hills and Western Ghats from Konkan southwards to Kerala.

English ► Silverweed.

Siddha/Tamil ► Unnayangodi.

Folk ► Khedari, Bond vel (Maharashtra).

Action ► Leaves—a paste is applied externally in cough and quinsy.

Leucaena glauca Benth.

Synonym ► *L. leucocephala* (Lam.) de Wit.

Family ► *Mimosaceae.*

Habitat ► The plains of India.

English ► White Popinac, Lead tree.

Siddha/Tamil ► Tagarai.

Folk ► Vilaayati Baval Lasobaval (Gujarat).

Action ► The bark and leaves contain 16.3 and 3% tannin respectively. Leaves also contain quercitrin (0.08%). The toxicity of the plant is due to an alkaloid leucenine or

leucenol. Beta-and alpha-amino-propionic acid is reported to be identical with mimosine (from *Mimosa pudica*).

Seeds, in addition to a fatty oil (8.8%), also contain mucilage composed of mannans, glactans and xylans. Stachyose is also reported to be present in the seeds. (Heat treatment of leaves and seeds after moistening lowers the alkaloid content.)

Leucas aspera Spreng.

Family ► *Labiatae; Laminceae.*

Habitat ► Throughout India in cultivated fields, wastelands, roadsides.

English ► White Dead Nettle.

Ayurvedic ► Dronpushpi, Phalepushpaa, Kutambaka.

Siddha/Tamil ► Thumbai.

Folk ► Guumaa, Halkusa (smaller var.), Tumbaa.

Action ► Carminative, antihistaminic, antipyretic, febrifuge, antiseptic. Used in jaundice, anorexia, dyspepsia, fever, helminthic manifestation, respiratory and skin diseases.

Flowers—given with honey for coughs and colds to children. Leaves—juice is used as an external application for psoriasis, chronic skin eruptions and painful swellings.

An alcoholic extract of leaves shows antibacterial activity.

The plant gave oleanolic acid, ursolic acid and beta-sitosterol. The root contains a triterpenoid, leucolactone, and the sterols, sitosterol, stigmasterol and campesterol.

Leucas cephalotes (Roth.) Spreng.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Throughout the greater part of India, as a weed, ascending up to 1,800 m in the Himalayas.

Ayurvedic ► Dronpushpi, Katumbaa.

Siddha/Tamil ► Tumbai.

Folk ► Guumaa, Dhurpi saaga, Halkusa (bigger var.), Tumbaa.

Action ► Plant—stimulant, diaphoretic, antiseptic (fresh juice is used in scabies), insecticidal. Flowers—a syrup is used as a domestic remedy for coughs and colds. Dry leaves along with tobacco (1 : 3) are smoked to treat bleeding as well as itching piles.

The Ayurvedic Pharmacopoeia of India indicated the use of the dried whole plant in jaundice, inflammations, cough, bronchial asthma and intermittent fever.

The plant contains beta-sitosterol glycoside and traces of an alkaloid.

Dosage ► Whole plant—5–10 ml juice; 1–3 g powder. (*API,* Vol. II.)

Leucas lavandulaefolia Rees.

Synonym ► *L. linifolia* Spreng.

Family ► *Labiatae; Lamiaceae.*

Ayurvedic ► Dronpushpi (related species).

Folk ► Tumbaa, Guumaa.

Action ► Leaves—a decoction is used as a sedative in nervous disorders; also as a stomachic and vermifuge. Crushed leaves are applied externally for dermatosis, a poultice to sores and wounds.

Roots, stems and leaves are cyanogenetic.

Leucas martinicensis R. Br.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Bihar and South India.

Folk ► Guumaa (var.). Sugandhak is a doubtful synonym.

Action ► Plant—an infusion is given for colds and gastrointestinal troubles.

Ligularia tussilaginea (Burm. f) Makino.

Synonym ► *L. kaempferi* Sieb & Zucc. *Senecio kaempferi* DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Japan; grows in Indian gardens.

Action ► Used for obstinate skin diseases.

The rhizomes contain inulin and beta-dimethylacrylic acid.

Lilium candidum Linn.

Family ► *Liliaceae.*

Habitat ► Native to Southern Europe and South-West Asia; grown in Indian gardens.

English ► Madona Lily, Annunciation Lily, White Lily.

Action ► Bulb—astringent, demulcent. Used for gynaecological disorders. A decoction of the bulbs in water or milk is given for dropsy; a poultice is applied to tumours, ulcers and skin inflammations. Fresh flowering plant is used in homoeopathy as an antispasmodic; the pollen is used against epilepsy.

A total extract stimulates phagocytosis in mice. The bulbs contain alkaloids (pyrroline derivatives), jatropham, ethyljatropham and citraconic acid imides.

Mucous, tannin, sterine and glucoside impart anti-inflammatory, analgesic, diuretic and expectorant properties to the bulb.

Bulbs of *Lilium* species contain soluble polysaccharides (glucomannans), starch, gamma-methylene glutamic acid and tuliposide.

Lilium giganteum Wall.

Family ► *Liliaceae.*

Habitat ► Temperate Himalayas from Kumaon and Garhwal to Sikkim, Khasi and Aka hills and Manipur at altitudes of 1,200–3,000 m.

Folk ► Gaayotraa (Jaunsar).

Action ► Leaves—used as an external cooling applications to alleviate pains of wounds and bruises.

Lilium polyphyllum D. Don.

Family ► *Liliaceae.*

Habitat ► Uttaranchal, Himachal Pradesh.

Ayurvedic ► Kaakoli, Madhuraa, Kshira, Vayhasthaa, Karnikaa, Vaayasoli.

Action ► Tuberous root—used as a tonic in emaciation and as a source of energy, after dry roasting.

Dosage ► Tuberous root—3–6 g. (*API,* Vol. III.)

L

Lilium tigrinum Ker-Gawl.

Family ► *Liliaceae.*

Habitat ► Native to China and Japan; cultivated in Indian gardens.

English ► Tiger Lily, Crumple Lily.

Action ► Bulbs—used as a cardiac tonic. Flowers—used for ovarian neuralgia, also recommended in myoptic astigmia.

The bulbs of *Lilium martagon* Linn., Turk's Cap Lily, also possesses cardiotonic properties and are used in the treatment of dysmenorrhoea; externally for ulcers.

Lilium wallichianum Schutt. f.

Family ► *Liliaceae.*

Habitat ► Western Himalayas, Nepal, Lushai hills, Manipur and hills of South India at altitudes of 300–2,400 m.

Folk ► Findora. Badai (Lushai).

Action ► Dried bulb scales—demulcent; used like salep in pectoral complaints.

Limnanthemum cristatum (Roxb.) Griseb.

Synonym ► *Menyanthes hydrophyllum* Lour.
Nymphoides hydrophyllum Kuntze.

Family ► *Menyanthaceae.*

Habitat ► Throughout India, in fresh water ponds and tanks. (Considered by some authors a synonym of *Nymphoides* Hill.)

Folk ► Ghainchu, Tagarmuula; Panchuli, Chandmalla (Bengal); Kumudini (Maharashtra).

Action ► Plant—used in fevers and jaundice. Seeds—anthelmintic. Stalks and leaves—applied to ulcers and insect bites. A decoction is used as a wash for parasitic skin affections. The plant is used as a substitute for *Swertia Chirata.*

The rhizomes and roots of *Nymphoides macrospermum* Vasudevan (*Family*: *Menyanthaceae*) are sold in the market as Granthik Tagar. These are used as a substitute for *Valeriana hardwickii* Wall. in neurological disorders and colic.

Limnanthemum indicum (L.) Griseb.

Synonym ► *Menyanthes indica* Linn.
Nymphoides indicum (L.) O. Kuntze.

Family ► *Menyanthaceae.*

Habitat ► Throughout India, in tanks and back waters.

Folk ► Barachuli, Chinnambal (Kerala).

Action ► Plant—bitter, febrifuge, antiscorbutic. Used as a substitute for *Swertia Chirata* in fever and jaundice.

Limnanthemum nymphaeoides Hoffm. & Link.

Synonym ► *Nymphoides peltata* (Gmel.) O. Kuntze.

Family ► *Menyanthaceae.*

Habitat ► Kashmir.

English ► Fringed Water-Lily.

Folk ► Kuru, Khairposh (Punjab).

Action ► Leaf—used in periodic headache.

Limnophila aromatica (Lam.) Druce.

Synonym ► *L. gratissima* Blume.

Family ► *Scrophulariaceae.*

Habitat ► South Bihar, Orissa, Assam, Western parts of South India, up to 600 m, also in back waters.

Folk ► Aamragandha Karpuur (non-classical); Karpuur (Bengal); Ambuli (Maharashtra); Manganari (Kerala). Kuttra.

Action ► Plant—galactagogue, aperient, antiseptic. Juice given in fever and to nursing mothers when milk is sour. Oil—antiseptic.

The plant gave an essential oil (0.1%), containing *d*-limolene and *d*-perillaldehyde as principal constituents. The essential oil showed significant antimicrobial activity against *Bacillus subtilis, Candida albicans, Aspergillus niger* and *Rhizopus oryzae.*

The plant, made into a liniment with coconut oil, is used in elephantiasis.

L. conferia Benth., known as Munganari in Kerala, contains flavonoids showing anti-inflammatory activity, quercetin showed significant activity only at a dose of 150 mg/kg, while wogonin, nevadensin and quercetin-pentamethyl ether at 75 mg/kg. The essential oil from the plant exhibited antifungal activity against ringworm fungi.

Limnophila indica (Lam.) Bruce.

Synonym ► *L. gratioloides* R. Br. *L. racemosa* Benth.

Family ► *Scrophulariaceae.*

Habitat ► Throughout India in damp places, swamps and rice fields.

Folk ► Kuttra; Karpuur (Bengal), Ambuli (Maharashtra); Manganari (Kerala).

Action ► Plant—carminative, antiseptic. Leaves—an infusion is given in dyspepsia and dysentery. A liniment prepared from the plant is used in elephantiasis.

Related species: *L. rugosa* (Roth) Merrill, synonym *L. roxburghii* G. Don,

known as Kaalaa Karpuur (throughout India), is used as diuretic, stomachic, digestive tonic. Also used as a hair perfume.

Limonia crenulata Roxb.

Synonym ► *Hesperethusa crenulata* (Roxb.) M. Roem.

Family ► *Rutaceae.*

Habitat ► Throughout India, from Punjab and Kumaon eastwards; in Assam, Bihar, Orissa, Madhya Pradesh, Maharashtra, Karnataka and South India.

L

Ayurvedic ► Bilvaparni.

Siddha/Tamil ► Nayvila.

Folk ► Ran-limbu, Naringi (Mumbai), Tondsha (Maharashtra), Beli, Bainthaa.

Action ► Dried fruit—stomachic; used in pestilent fevers, also as an antidote to poisons. Root—purgative, sudorific.

The plant showed anti-inflammatory activity which was attributed to 8-hydroxy-6-methoxy-2-methyl-anthraquinone-3-O-beta-D-glucopyranoside in animal studies.

The leaves contain an essential oil; major constituents are geraniol, alpha- and beta-pinene, 1,8-cineole, elemol acetate, linool, alpha-terpinolene, camphor, eudesmol, *p*-cymene, camphane, azulene, borneol acetate, alpha-terpenol, alpha-curcumene, alpha thujone, limolene, myrcene and beta-ocimene.

Leaves also contain anthraquinones and dalbargin galactopyranoside.

Lindenbergia indica (Linn.) Kuntze.

Synonym ► *L. urticaefolia* Lehm.

Family ► *Scrophulariaceae.*

Habitat ► Throughout India, ascending to 2,100 m in the Himalayas.

Folk ► Haldi Basanto (Bengal), Dhol (Maharashtra), Patthar-chatti (Gujarat), Bheet-chatti.

Action ► Plant—juice is given in chronic bronchitis; also applied to skin eruptions.

Lindera nessiana Benth.

Family ► *Lauraceae.*

Habitat ► Temperate Himalayas from Nepal eastwards at 1,800–2,400 m, and in Assam.

Folk ► Gandha-daaru (Bengal), Siltimur (Nepal).

Action ► Carminative.

The plant is reported to yield sassafras, which is substituted for the true sassafras from *Cinnamomum glanduliferum* Meissn.

The seeds yield a fatty oil (60.7%). It gave methyl esters : methyl laurate 75.2, methyl caprate 13.3, methyl oleate 5.4, methyl myristate 2.4, and methyl-palmitate 0.5%.

Linum usitatissimum Linn.

Family ► *Linaceae.*

Habitat ► Cultivated mainly in Madhya Pradesh, Uttar Pradesh, Maharashtra, Bihar and Rajasthan.

English ► Linseed, Flax.

Ayurvedic ► Atasi, Umaa, Masrnaa, Nilapushpi, Kshumaa.

Unani ► Kattan.

Siddha/Tamil ► Ali, Virai, Sirrali (Seed).

Action ► Seed—demulcent, emollient, laxative, antilipidemic, antitussive, pectoral (used in bronchitis and cough). Flowers—used as nervine and cardiac tonic. Oil—used in burns, skin injuries and sores.

Key application ► Internally, for chronic constipation, for colons damaged by abuse of laxatives, irritable bowel syndrome, diverticular disease, symptomatic short-term treatment of gastritis and enteritis. Externally, for painful skin inflammations. (*German Commission E, ESCOP, The British Herbal Pharmacopoeia.*)

The plant contains chlorogenic acid and its isomer. Also present are palmitic, stearic, oleic, linoleic acids, along with amino acids, and sugars. Linseed also contains mucilage (3–10%) in epidermis; fatty oil (30–40%); cyanogenic glycosides (0.05–00.1%) mainly linustatin, neolinustatin and linamarin; lignans; phenylpropane derivatives including linusitamarin. (Cyanogenic glycosides are not found toxic in therapeutic doses as these are broken down only to a limited extent in the body.)

The seeds are an excellent source of dietary alpha-linolenic acid for modifying plasma and tissue lipids. Flaxseed preparations reduced atherogenic risk in hyperlipemic patients. (Cited in *Expanded Commission E Monographs.*)

Human studies have indicated Flaxseed's use in atherosclerosis, hypercholesterolemia, lupus nephritis, chronic renal diseases and in cancer prevention (active principle: lignan precursor secoisolariciresinol diglycoside). (Sharon M. Herr. Also *Am J Clin Nutr,* 1999, 69, 395–402.)

The PP glucose response to a 50 g carbohydrate load given as Flaxseed bread was found to be 27% lower when compared with regular white bread.

Taking Flaxseed oil daily for 3 months did not improve symptoms of pain and stiffness in rheumatoid arthritis and no effect was observed on RA, such as C-reactive protein and ESR. (*Natural Medicines Comprehensive Database,* 2007.)

The water-binding capacity and rheological properties of linseed mucilage resembled those of guar gum.

Dosage ► Ripe seed—3–6 g powder. (*API,* Vol. I.) Flower-bud—3–6 g; oil—5–10 ml. (*CCRAS.*)

Lipasis rostrata Rehd.

Family ► *Orchidaceae.*

Ayurvedic ► Jivaka-Rshabhaka (bulbs of *Microstylis wallichi* Lindl. and *M. musifera,* also of other orchids, are sold as Jivaka-Rshabhaka).

Action ► Used in age-sustaining and invigorating tonics.

Lippia geminata H. B. & K.

Synonym ► *L. alba* (Mill.) N.E.Br. *L. javanica* (Burm.f.) Spreng.

Family ► *Verbenaceae.*

Habitat ► Bihar and Orissa to Assam; Madhya Pradesh, Nilgiris and Anaimalais up to 900 m in wet places and river banks.

Folk ► Basula (Madhya Pradesh), Naagaa-aiari (Orissa).

Action ► Leaves—stomachic and nervine. Essential oil—fungitoxic.

The essential oil from leaves contains citral, neral and geranial. Diterpenes, *d*- and *l*-limonene, *l*-piperitone, geranial. Diterpenes, *d*-and *l*-limonene, *l*-piperitone, lippone, a saturated ketone, *d*-alpha-pinene, *dl*-dihydrocarvone, citral and camphor have been identified in different samples.

Lippia nodiflora Rich.

Synonym ► Phyla nodiflora (Linn.) Greene.

Family ► *Verbenaceae.*

Habitat ► Throughout India, in wet places and river banks.

English ► Wild sage.

Ayurvedic ► Jalapippali, Shaaradi, Shakulaadani, Jalakarnaa, Matsyagandhaa. Laangali (now equated with *Gloriosa superba*).

Unani ► Bukkum Booti.

Siddha/Tamil ► Paduthalai.

Action ► Plant—cooling, febrifuge, diuretic. Poultice used as maturant for boils. Leaves—an infusion is given to women after delivery.

An alcoholic extract of the leaves shows antibacterial activity against *E. coli.* The leaf juice enters into hair oils for alopecia areata.

Aerial parts are reported to contain flavonoids, flavone aglycones and flavone sulphates.

Dosage ► Whole plant—10–20 ml juice. (*CCRAS.*)

Liquidambar formosana Hance.

Family ► *Altingiaceae; Hamamelidaceae.*

Habitat ► Native to China; now reported to have been introduced into Lalbagh gardens, Bangalore.

English ► Fragrant Maple.

Ayurvedic ► Silhak (var.).

Unani ► Silaaras (var.).

Action ► See *Liquidambar orientalis.*

Balsam (Chinese Storax) contains cinnamic acid (16%). Cinnamyl alcohol, borneol, a resin alcohol and volatile constituents (1.8–8%). The leaves on steam-distillation yield 005% of a volatile oil consisting principally of terpenes (88%).

Liquidambar orientalis Mill.

Family ► *Altingiaceae; Hamamelidaceae.*

Habitat ► Native to Asia Minor.

English ► Storax, Oriental Sweet Gum.

Ayurvedic ► Turushka, Silhaka, Kapitaila.

Unani ► Ambar Saayil, Silaaras.

Siddha/Tamil ► Neri-arishippal.

Action ► Balsam—anti-inflammatory, stimulating expectorant, antiparasitic, antiseptic, antimicrobial. Used externally in scabies, ringworm and other skin diseases. Used for coughs and bronchitis as an inhalation.

Storax contained cinnamic acid up to 30%—cinnamin acid esters, cinnamyl cinnamate (styracin), phenylpropyl cinnamate; triterpene acids; vanillin; styrene; aromatic alcohols. Pentacyclic triterpene aldehydes—liquidambronal and ambronal—have been isolated from nonvolatile part of resin along with bornyl *trans*-cinnamate.

Dosage ► Gum—1–3 g. (*CCRAS.*)

Liriodendron tulipifera Linn.

Family ► *Magnoliaceae.*

Habitat ► Native to North America; introduced into hill stations in India.

English ► Tulip tree.

Action ► Bark—antipyretic, diaphoretic; used in rheumatism, dyspepsia and as antimalarial.

The root contains an alkaloid tulipiferin, traces of a glycoside, essential oil and tannin.

Litchi chinensis (Gaertn.) Sonn.

Synonym ► *Nephelium litchi* Cambess.

Family ► *Sapindaceae.*

Habitat ► Native to China; now cultivated mainly in Northern Bihar, particularly in Muzaffarpur and Darbhanga districts, and Saharanpur, Dehra Dun, Muzaffarnagar, Gorakhpur, Deoria, Gonda, Basti, Faizabad, Rampur, Bareilly, Bahraich, Kheri and Pilibhit districts of Uttar Pradesh.

English ► Litchi, Lychee.

Action ► Fruit—refrigerant during summer. Leaf—used in bites of animals.

Litchi aril contains: total sugars (as invert sugar) 12.1–14.8; reducing sugar 9–13.7; non-reducing sugar 1.0–3.4; acidity (as citric acid) 0.22–0.36%; and ascorbic acid 34.5–45.4 mg/100 g.

The plant contains levulinic, malic, citric, lactic, malonic, fumaric, succinic, phosphoric and glutaric acids.

The Bark contains friedelin and stigmasterol.

Litchi seeds are prescribed in Malaya for neurological disorders and orchitis. In seed lipids, fatty acids cyclopropanoic 42.0; oleic 27.0, palmitic 12.0 and linoleic 11.0%, have been determined.

Lithospermum officinanle Linn.

Family ► *Boraginaceae.*

Habitat ► Kashmir and Kumaon, at altitudes of 1,500–2,700 m.

English ► Corn Gromwell.

Folk ▶ Lubis firmun.

Action ▶ Leaves—sedative. Seeds—diuretic, lithotriptic. A decoction of roots and twigs is given in the form of syrup in eruptive diseases, such as smallpox and measles.

The aerial parts contain pyrrolizidine alkaloids.

Saline extracts of the aerial parts and roots, administered to experimental animals by injection, inhibit oestrus and the functioning of ovaries and testes; the activity of the thyroid gland is also reduced. The active principle is formed from phenolic precursors like caffeic, chlorogenic, rosmarinic acid as well as luteolin-7 beta-glucuronide by an oxidation step. Other constituents are lithospermic acid and shikonin.

Shikonin and acetyl-shikonin, the pigments of the root, exhibit anti-inflammatory activity comparable to phenylbutazone.

An infusion of leaves is used in Spain as sedative.

L

Litsea glutinosa (Lour.) C. B. Robinson.

Synonym ▶ *L. sebifera* Pers. *L. chinensis* Lam.

Family ▶ *Lauraceae.*

Habitat ▶ Punjab, Khasi Hills, Bengal, Assam and South India.

English ▶ Common Tallow Lowrel.

Ayurvedic ▶ Medaasaka.

Unani ▶ Maidaa-lakdi, Maghaase-Hindi.

Siddha/Tamil ▶ Mushaippeyetti, Elumpurukki, Uralli.

Action ▶ Leaf—antispasmodic and emollient. Bark—demulcent, emollient, astringent, antidiarrhoeal, anodyne. Root—decoction is used as an emmenagogue. Oil from berries—used in rheumatism. Essential oil—antibacterial, antifungal.

The bark is mucilaginous.

The plant contains a polysaccharide. Leaves and stem contain aporphine alkaloids—boldine, laurotetanine, actinodaphnine and their derivatives. The trunk bark gave sebiferine and litseferine.

Boldine produced dose-dependent inhibition of induced microsomal peroxidation in experimental studies.

Dosage ▶ Bark—3–5 g powder. (*CCRAS.*)

Litsea monopetala (Roxb.) Pers.

Synonym ▶ *L. polyantha* Juss.

Family ▶ *Lauraceae.*

Habitat ▶ Assam and Eastern Himalayas, also Tamil Nadu.

Ayurvedic ▶ Maidaa-lakdi (var.).

Siddha/Tamil ▶ Maidalagadil, Picinpattai.

Action ▶ Bark—stimulant, astringent, spasmolytic, stomachic, antidiarrhoeal. Root—applied externally for pains, bruises and contusions.

The bark contains beta-sitosterol and an aporphine alkaloid, actinodaphnine.

Litsea stocksii Hook. f.

Family ► *Lauraceae.*

Habitat ► The hills of western Deccan Peninsula.

Folk ► Pisi, Posha (Maharashtra).

Action ► Leaves—an infusion is given in irritation of bladder and urethra.

The seeds yield a fat consisting mostly of lauric acid with a small amount of oleic acid.

The leaves are mucilaginous.

Lobelia chinensis Lour.

Synonym ► *L. radicans* Thunb.

Family ► *Campanulaceae, Lobeliaceae.*

Habitat ► Nepal, Chota Nagpur and Khasi hills at altitudes of 900–1,500 m.

Action ► Plant—used in China for fevers and asthma. Root—considered depurative and antirheumatic in Indo-China. The plant is one of the constituent of a tincture formulation used for the treatment of scars.

The rhizomes of the plant are reported to contain the polyfructosan, lobelinin.

Lobelia inflata Linn.

Family ► *Campanulaceae; Lobeliaceae.*

Habitat ► Native to eastern United States; imported into India.

English ► Indian Tabacco, Pukeweed.

Ayurvedic ► Devanala (var.).

Action ► Antiasthmatic, antispasmodic, broncho-dilator, expectorant, mild sedative and relaxant. Used as a tabacco deterrent (as a major ingredient in many antismoking mixtures).

Key application ► In the treatment of asthma, bronchitis. (*German Commission E.*) As respiratory stimulant. (*The British Herbal Pharmacopoeia.*)

Lobelia contains piperidine alkaloids, mainly lobeline, with lobelanine, lobelanidine, norlobelanine, isolobinine. Lobeline stimulates respiration in animals by stimulating respiratory centre and at high doses stimulates the vomiting centre.

Lobeline has similar but less potent pharmacological properties to nicotine but 1/20–1/5 as potent.

Lobeline (0.5%) has also been used as an active ingredient in skin-lightening preparations.

Clinical research could not demonstrate lobeline efficacy greater than placebo in smoking cessation. It was disallowed as an ingredient in antismoking products in the US in 1993. (*Natural Medicines Comprehensive Database,* 2007.)

The leaves contain beta-amyrin palmitate which possesses sedative and antidepressant properties comparable to the antidepressant drug mianserin. Methanolic extract of leaves exhibited antidepressant activity.

The leaf powder is toxic at 0.6–1.0 g. (Francis Brinker.)

Lobelia leschenaultina (Persl) Skottsb.

Synonym ▶ *L. excelsa* Lesch.

Family ▶ *Campanulaceae; Lobeliaceae.*

Habitat ▶ Hills of South India at altitudes above 1,800 m.

Ayurvedic ▶ Nala (var.).

Folk ▶ Devanala (var.) (Maharashtra.)

L

Action ▶ Leaves—filtered solution is used in the control of aphids, tingids and mites on vegetable and other crops. Plant—poisonous to man and livestock. The leaves are cured and smoked as tabacco.

Lobelia nicotianaefolia Heyne.

Family ▶ *Campanulaceae; Lobeliaceae.*

Habitat ▶ Deccan, Konkan and Western Ghats, at altitudes of 900–2,100 m.

English ▶ Wild Tobacco.

Ayurvedic ▶ Devanala, Nala (var.).

Siddha/Tamil ▶ Kattuppugaiyilai, Upperichedi.

Action ▶ Used as a substitute for Lobelia inflata.

An analysis of *Lobelia nicotianaefolia,* grown in Maharashtra, shows that the plant contains appreciable quantities of *nor*-lobelanine and small amounts of lobinine and minor bases.

Lobelia cardinalis Linn., Cardinal Flower, is cultivated in Indian gardens. It contains lobinaline as main alkaloid. Lobinaline depresses blood pressure but has no influence on respiration. *L. erinus* Linn. and *L. succulenta* Blume, synonym *L. affinis* Wall. also contain alkaloids with lobinaline 0.445%.

Lobelia cordigera Cav., synonym *L. fulgens* Willd., an ornamental Lobelia sp., grown in Indian gardens, contains inulin.

Lobelia pyramidalis Wall. (Himalayas from Kumaon eastwards to Sikkim and Assam at altitudes of 900–2,700 m) contains 0.29–0.38% alkaloids as lobeline, and may be used as a substitute for *Lobelia inflata.*

Lodoicea maldivica (Poir.) Pers.

Family ▶ *Arecaceae; Palmae.*

Habitat ▶ A dioecious palm, cultivated in gardens as an ornamental.

English ▶ Double Coconut Palm, Sea Coconut Palm.

Ayurvedic ▶ Samudra-naarikela, Dariyaayee Naariyal.

Unani ▶ Naarjeel-e-Daryaayee, Naarjeel-e-Bahari.

Siddha/Tamil ▶ Kadalthengai, Aklaari.

Action ▶ The water of the green fruit and its soft kernel—antacid and antibilious.

A decoction of the fibrous husk is reported to bring down urinary sugar

level in diabetic patients (the effect is temporary).

The Ayurvedic Pharmacopoeia of India recommends dried endosperm in gastroenteritis.

Dosage ► Dried endosperm—5–10 g powder. (*API,* Vol.IV.)

Lolium temulentum Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► The Western Himalayas, Punjab and Upper Gangetic Plain.

English ► Darnel, Taumelloolch.

Ayurvedic ► Mochani.

Folk ► Mostaki, Visha-ghaasa (Bihar).

Action ► Sedative.

The overground parts of the grass gave alkaloids—loline and perloline. The caryopses of the plant contain volatile alkaloids—N-acetylloline, N-formylloline and N-acetylnorloline.

Loline dihydrochloride did not show CNS toxicity.

Lonicera japonica Thunb.

Family ► *Caprifoliaceae.*

Habitat ► Assam (Lushai hills); cultivated in gardens.

English ► Japanese Honeysuckle.

Action ► The plant is used in China as an antipyretic, stomachic and in dysentery, also as an antidote to consumption of poisonous mushroom. Dried flowers are considered diuretic.

The plant contains tannin and a saponin; lutolin and *i*-inositol have been isolated from the flowers. The berries are rich in carotenoids of which cryptoxanthin is the major component. *Lonicera angustifolia* Wall. ex DC. (the Himalayas from Kashmir to Sikkim at altitudes of 1,800–3,600 m), known as Geaang, Chulu and Mithik in Punjab; and *L. glaucea* Hook. f. Thoms. (the Himalayas from Kashmir to Kumaon at altitudes of 3,600–4,800 m), known as Sheaa and Shevaa in Punjab and Kumaon, possess antispasmodic properties.

Lonicera periclymenum Linn., Woodbine Honeysuckle, cultivated in hill stations of India, possesses antispasmodic, diuretic and sudorific properties. Flowers are used in the form of syrup in diseases of the respiratory tract. The leaves contain an amorphous glycoside and salicylic acid. Secoiridoid and secoxyloganin have been isolated from the plant.

Lonicera quinquelocularis Hardw. is equated with Himalayan Honeysuckle, found in the Himalayas from Kashmir to Bhutan, up to an altitude of 4,000 m.

Honeysuckle, also known as Duch Honeysuckle, Goat's Leaf, is equated with *Lonicera caprifolium* Linn.

Loranthus falcatus Linn. f.

Synonym ► *Dendrophthoe falcate* (Linn. f.) Etting.

Family ► *Loranthaceae.*

Habitat ► Throughout India, as a parasite.

Ayurvedic ► Bandaaka, Sanharshaa, Vrikshaadani, Vrikshaaruha, Vriksha-bhakshaa. (A large bushy parasite, which causes much damage to the host tree.)

Folk ► Baandaa.

Action ► Tender shoots—contain 10% tannins. Bark—astringent and narcotic.

Loranthus pentandrus Linn.

Synonym ► *Dendrophthoe pentandra* (Linn.) Miq.

Family ► *Loranthaceae.*

Habitat ► Sylhet. (A parasite found on trees.)

Ayurvedic ► Bandaaka (var.).

Folk ► Baandaa.

Action ► Leaves—used as poultice for sores and ulcers. The twigs contain quercitrin and a wax, which gives melissyl alcohol. The twig ash (8.95%) contains manganese (0.26%).

Luffa acutangula (Linn.) Roxb. var. **amara** (Roxb.) C. B. Clarke.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India.

English ► Ribbed or Ridged Gourd (bitter var.).

Ayurvedic ► Katukoshataki, Tiktakoshtaki.

Action ► Plant—purgative, diuretic. Used for oedema, splenic enlargement, cough and asthma. Seeds—emetic, expectorant.

The plant contains the oleanane type triterpene saponins. It is reported to exhibit antitumour activity.

The fruit juice is used as a homoeopathic drug in hepatic congestion, irritation and inflammation of gastric mucosa.

Dosage ► Leaf, fruit, root—10–20 ml juice. (*CCRAS.*)

Luffa cylindrica (Linn.) M. J. Roem.

Synonym ► *L. aegyptiaca* Mill. *L. pentandra* Roxb.

Family ► *Cucurbitaceae.*

Habitat ► Cultivated throughout greater parts of India.

English ► Smooth Luffa, Spongegourd, sponge Cucumber.

Ayurvedic ► Dhaamaargava, Mahaakoshtaki, Mahaajaalini, Raajakoshataki.

Siddha/Tamil ► Mozhukupeerankai, Pikku.

Action ► Plant—used against pharyngitis, rhinitis, mastitis, oedema, swellings and burns. Leaves—used for chronic bronchitis. Leaf juice is given for amenorrhoea. Flowers—used for treating migraine. Seeds—alcoholic extract exhibited 9.80% fungitoxic activity.

German Commission E included *Luffa aegyptiaca* among unapproved herbs. Preparations of Luffa sponge, used as a preventive for infections or cold, as a remedy for colds, nasal

catarrh as well as sinusitis and suppuration of the sinus, have been negatively evaluated.

The saponins isolated from aerial parts are effective in controlling obesity, also the side-effects of steroids.

The oleanane saponins, lucyoside A-H (at least one component) is effective in preventing loss of hair.

Spongegourd extracts or saponins (ginsenosides and lucyosides) find application in topical medication for skin disorders and haemorrhoids. Lucyosides are also used as antitussive.

The roots of the mature plants contain an acidic pentacyclic triterpene, bryonolic acid. Bryonolic acid showed antiallergic and anti-inflammatory activity in experimental animals. An aqueous extract of seeds showed strong fibrinolytic activity. It also showed anticancer activity in transplanted tumours.

Dosage ▶ Leaf, flower, fruit—10–20 ml juice. (*CCRAS.*)

Luffa echinata Roxb.

Family ▶ *Cucurbitaceae.*

Habitat ▶ Uttar Pradesh, Bihar, Bengal and Gujarat.

English ▶ Bristly Luffa.

Ayurvedic ▶ Devadaali, Devataadaka, Jimuuta, Garaagari, Kothaphala.

Siddha/Tamil ▶ Panibira.

Folk ▶ Bandaal (Varanasi).

Action ▶ Fruit—purgative (intensely bitter and fibrous). An infusion is given in biliary and intestinal colic; also in nephritis and chronic bronchitis.

The fruit contains chrysoeriol and its glycosides as principal flavonoids. Seeds contain cucurbitacin B, triterpene alcohols, and a saponin with oleanolic acid as sapogenin.

The alcoholic and ether extracts of the plant showed protection against CCl4-induced hepatic injury in rats. The aqueous extract of fruits is beneficial in jaundice as it significantly lowered serum bilirubin level in chlorpromazine-induced jaundice in rats and human patients. The ethanolic extract (50%) of the plant exhibited hypoglycaemic activity.

The yellow-flowered var. of Devadaali (Eastern Himalayas, Sikkim, Bihar, Bengal) is equated with *Luffa graveolens* Roxb.

Dosage ▶ Fruit—1–3 g powder. (*CCRAS.*)

Lupinus albus Linn.

Family ▶ *Leguminosae; Fabaceae.*

Habitat ▶ Cultivated in gardens.

English ▶ While Lupine, Wolfsbohne.

Unani ▶ Turmus.

Action ▶ Seeds—deobstruent, carminative, alterative, anthelmintic. Used as an external application to ulcers.

The seed contains alkaloids *d*-and *dl*-lupanine and hydroxylupanine.

The principal alkaloid of Blue Lupine (*Lupinus angustifolius* L.) seeds is *d*-lupanine, also hydroxylupanine.

Yellow Lupine (*Lupinus luteus* L.) seeds contain lupinine (0.43–0.73%) and sparteine (0.20–0.37%). Seeds are feebly cyanogenetic. Other species of Indian gardens, *Lupinus hirsutus* Linn. and *Lupinus mutabilis* Sweet, contain sparteine.

Luvunga eleutherandra Dalz in part.

Family ▶ *Rutaceae.*

Habitat ▶ The western part of Peninsular India, from Konkan southwards to Anaimalai and Travancore hills, up to an altitude of 1,000 m.

Ayurvedic ▶ Lavanga-lataa (var.).

Folk ▶ Kokilaa (Bengal).

Action ▶ See *Luvunga scandens.*

Luvunga scandens (Roxb.) Buch.-Ham. ex Wight.

Family ▶ *Rutaceae.*

Habitat ▶ Bengal, Assam and Khasi Hills.

Ayurvedic ▶ Lavanga-lataa.

Folk ▶ Sugandh-kokilaa (Bengal).

Action ▶ Essential oil—antifungal.

Mature berries contain coumarins. The essential oil from berries contains cinnamyl cinnamate, cineole, *d*-camphor and methyl cinnamate as major components.

Dried fruits are used in medicinal hair oils, prescribed for treating baldness.

The bark contains myricadiol, taraxerol and myricolal.

Lycium barbarum Linn.

Family ▶ *Solanaceae.*

Habitat ▶ Punjab, Rajasthan, Gujarat and Maharashtra.

Unani ▶ Chirchataa, Chirchitaa, Chirchitta.

Folk ▶ Kheechar Chirchataa.

Action ▶ Immunostimulatory, antiproliferatory, antiageing; antioxidant.

The leaves and flowers contain free quercetin (1.28 and 1.58 mg/g dry weight, respectively), and bound kaempferol. Total alkaloid percentage is nearly the same in shoots (1.26%) and fruits (1.24%) but lower in calli (0.83%) and roots (0.67%). Fruits had highest atropine content (0.95%) and shoots the highest hyoscyamine content (0.33%).

Flavonoids are active against *E. coli, Staphylococcus aureus* and *Candida albicans* (quercetin does not show activity against *Candida albicans*).

The polysaccharide extract from fruits showed antiageing, immunostimulatory and antiproliferatory activities. The polysaccharide acts as an antioxidant and prevented CCl4-induced increases in lipid peroxidases in liver. It can also protect against genetic damage from mutagenic and genotoxic compounds. This activity leads to its potential use in preventing the adverse effects of chemotherapeutic agents.

The fruit contain beta-carotene (8 mg/100 g dry weight), also free amino acids (1.0–2.6%); major amino acid is proline.

The dried fruit and root bark reduce cholesterol level by preventing its absorption in gastrointestinal tract. A constituent of the root bark, kukoamine exhibits cholesterol lowering, antihypertensive and hypoglycaemic effects. Hepatoprotective activity is attributed to a cerebroside constituent found in the fruit. (*Natural Medicines Comprehensive Database,* 2007.)

The fruit and root bark is contraindicated in bleeding disorders and hypoglycaemia. (Sharon M. Herr.)

Lycopersicon esculentum Mill.

Synonym ► *Solanum lycopersicum* Linn.

Family ► *Solanaceae.*

Habitat ► Cultivated in many parts of India.

English ► Tomato, Love Apple.

Unani ► Tamaatar.

Action ► Mild aperient, blood purifier, cholagogue, digestive. Used in homoeopathy for treating rheumatic conditions, colds, chills, digestive disorders, diabetes, obesity, leucorrhoea, metrorrhagia.

Tomato is a powerful deobstruent. It promotes flow of bile; mildly laxative, especially when taken raw. Tomato stimulates torpid liver and kidneys and helps to wash away toxins. Tomato is recommended for diabetics. It is a major dietary source of carotenoid lycopene.

Tomato juice inhibits carcinogenic N-nitrosocompound formation chiefly in the stomach. Most of the inhibition of formation of N-nitrosomorpholine by phenolic fraction of tomato juice was due to chlorogenic acids. The ascorbate fraction of the juice also contains compounds that inhibit nitrosation.

Consumption of tomato juice can significantly increase serum lycopene levels. (Decreased serum lycopene concentrations are associated with an increase risk of prostate cancer.) (*Natural Medicines Comprehensive Database,* 2007.)

The alcoholic extract of tomato possesses CNS depressant and analgesic properties.

Lycopodium clavatum Linn.

Family ► *Lycopodiaceae.*

Habitat ► Indigenous to North America, Europe, Asia; found in Kumaon, eastwards in West Bengal, Sikkim, Asam, Khasi Hills, Manipur and in Western Ghats.

English ► Common Club Moss.

Folk ► Naaga-beli (Nepal), Bendarali (Maharashtra).

Action ► Sedative, antispasmodic, diuretic. At one time used for urinary disorders (spasmodic retention of urine, catarrhal cystitis and chronic kidney disorders), and as a gastric sedative in gastritis.

The plant contains alkaloids (about 0.1–00.2%), including lycopodine, lycodoline, faucettimine and lycoflexine; triterpenoids including clavatol and oxoserrat derivatives; flavonoids including apigenin; polyphenolic acids including dihydrocaffeic.

Lycopodine produces uterine contractions and stimulates peristalsis in the small intestines of rodents.

The plant contains (dry basis): lipid 4.06 and desmethylsterols 0.05%.

Used in homoeopathy for distended abdomen, cough, cystitis, renal colic and disorders of menstruation.

Chinese Club Moss, equated with *Huperzia serrata,* is a different herb. Its constituent, huperzine A is thought to be beneficial in dementia due to its effect on acetylcholine levels.

L. annotinum Linn., *L. complanatum* Linn. (American Club Moss) and *L. selago* Linn. are among other species of *Lycopodium* occurring in India.

Lycopus europaeus Linn.

Family ► *Labiatae.*

Habitat ► Western Himalayas in Jammu and Kashmir, and Himachal Pradesh.

English ► Gipsywort, Bugleweed.

Folk ► Gandam-gundu, Jalneem.

Action ► Cardioactive, diuretic, peripheral vasoconstrictor, sedative, narcotic, antihaemorrhagic, antitussive, thyrostatic.

Key application ► In mild thyroid hyperfunction (contraindicated in thyroid hypofunction, enlargement of thyroid) with disturbances of vegetative nervous system; mastodynia (tension and pain in breast). No simultaneous administration of thyroid preparations. Administration of Bugleweed preparations interferes with the administration of diagnostic procedures using radioactive isotopes. (*German Commission E.*)

The leaves contain lithospermic acid. Plant contains luteolin-7-glucoside; ursolic acid, caffeic acid, chlorogenic acid, sinapic acid, ellagic acid and other derivatives of phenolic acid. The antioxidant activity of the plant is partially attributed to rosmarinic acid. Antigonadotropic activity of the leaf extract is attributed to phenolic precursors.

Ethanol extract of the plant showed diverse effects on the pituitary, thyroid and gonadal glands of rats.

A closely related species, *Lycopus virginicus* of Europe, exhibits antithyrotropic activity. It induces TSH repletion in hypothyroid rats and reduction of TSH levels in euthyroid rats. Antigonadotropic activity has been demonstrated in rats.

Lygodium flexuosum (L.) Sw.

Synonym ► *L. pinnatifidum Sw.*

Family ► *Schizaeaceae.*

Habitat ► Throughout India; up to an elevation of 1,500 m in the Himalayas.

Folk ► Vallipana (Malyalam); Bhuuta-bhairavi (Bengal), Bhuuta-raaj; Kalzhaa (Bihar). Rudrajataa is a doubtful synonym.

Action ► Plant—expectorant. Root—used in external applications for rheumatism, sprains, cut wounds, eczema, scabies, carbuncles. A decoction in drunk in gastric attacks.

The acetone extract of fresh leaves exhibits antifungal activity. The fern contains a methyl ester of gibberellin.

The plant contains lygodinolide, dryocrassol, tectoquinone, kaempferol, beta-sitosterol and stigmasterol. The root contains quercetin.

Alcoholic extract of the plant exhibited potent antifertility activity.

L. japonicum Sw., found in North India from Kashmir to Sikkim and Bhutan, and in Western mountains of South India, is used as an expectorant in China.

Lyonia ovalifolia (Wall.) Drude.

Synonym ► *Pieris ovalifolia* D. Don.

Family ► *Ericaceae.*

Habitat ► Outer Himalayas from Kashmir to Sikkim, at 1,000 to 2,500 m, and in Khasi hills between 1,200 to 2,000 m.

Folk ► Angyaar (Garhwal), Arwan (Punjab), Angeri (Nepal).

Action ► Young leaves and buds—used externally for cutaneous affections. Leaves—insecticidal. Honey from flowers—poisonous.

Leaves contain a toxic, insecticidal substance andromedotoxin.

The wood yields 0.51% ash, rich in soluble potassium salts.

L

M

Maba nigrescens Dalz. & Gibs.

Family ► *Ebenaceae.*

Habitat ► Gujarat.

Folk ► Ragat-Rohido (Gujarat), Rakta-Rohido.

Action ► Used for diseases of liver and spleen. In folk medicine, as a substitute for Rakta-Rohitaka. (Rohitaka is equated with *Tecomellia undulata* Seem., synonym *Tecoma undulata* G. Don, *Bignoniaceae.*)

In Gujarat, *Polygonum glabrum* Willd. (Polygonaceae) and *Myristica attenuta* Wall., synonym *Knema attenuata* (Wall.) Warb. (*Myristicaceae*) are also known as Rakta Rohido, and are used for diseases of liver and spleen.

In Mumbai, *Rhamnus wightii* Wight & Arn. (*Rhamnaceae*) is known as Rakta-Rohidaa. The bark is used as astringent and deobstruent.

Madhuca butyracea Macr.

Synonym ► *Aisandra butyracea* (Roxb.) Baehni.

Family ► *Sapotaceae.*

Habitat ► Found in sub-Himalayan tract from Kumaon to Bhutan.

Ayurvedic ► Madhuuka (related species).

Folk ► Phulwaaraa, Maakhaniaa Mahuaa.

Action ► Fat used as ointment in rheumatism, for chapped hands and feet during winter.

The flowers contain beta-amyrin acetate, friedelin, erythrodiol monopalmitate, beta—sitosterol and apha-spinasterol. The seeds contain triterpenoid saponins, butyroside C and butyroside D. A triterpenoidal sapogenin, butyraceol, has been isolated from the seed. The leaves contain butyracic acid. Defatted seed flour contains 10.4% saponins.

Administration of acute dose of saponins to albino rats caused severe diarrhoea and histopathological changes in liver and kidney and altered, particularly in female rats, levels of serum alkaline phosphatase, cholesterol and proteins.

Madhuca indica J. F. Gmel.

Synonym ► *M. longifolia* (Koen.) Macb. var. *latifolia* (Roxb.) Cheval. *Bassia latifolia* Roxb.

Family ► *Sapotaceae.*

Habitat ► A large tree, cultivated mainly in Uttar Pradesh, Bihar.

English ► Mahua tree, Moha.

Ayurvedic ► Madhuuka, Madhupushpa, Madhusrav, Gudapushpa.

Unani ► Mahuaa.

Siddha/Tamil ► Ieluppai.

Action ► Flowers—stimulant, demulcent, laxative, anthelmintic, bechic. Seed oil—galactogenic, anticephalgic, emetic. Used in pneumonia, skin diseases, piles. Bark—astringent, emollient. Used for tonsilitis, gum troubles, diabetes, ulcers. Bark, seed oil and gum—antirheumatic.

The Ayurvedic Pharmacopoeia of India recommends the flower without stalk or calyx in asthma and pthisis.

The fruit pulp yielded a number of triterpenoids (including alpha- and beta-amyrin acetate); also *n*-hexacosanol, beta-D-glucoside of beta-sitosterol and free sitosterol.

Nut shell gave beta-sitosterol glucoside, quercetin and dihydroquercetin.

The carollas are rich source of sugars, vitamins, phosphorus, calcium and iron; magnesium and copper are also present. The sugars identified are sucrose, maltose, glucose, fructose, arabinose and rhamnose.

The seeds yielded saponins—2,3-*di*-O-glucopyranoside of bassic acid (saponin A and saponin B). Mixture of saponins from seeds exhibits spermicidal activity.

Trunk bark contained lupeol acetate, beta-amyrin acetate, alpha-spinasterol, erythrodiol monocaprylate, betulinic acid and oleanolic acid caprylates.

Dosage ► Flower—10–15 g (*API,* Vol. II.); flower-juice—10–20 ml; bark—50–100 ml decoction. (*CCRAS.*)

M

Madhuca longifolia
(Koen.) Macb.

Synonym ► *Bassia longifolia* Koenig.

Family ► *Sapotaceae.*

Habitat ► Cultivated in Uttar Pradesh, Bihar, Andhara Pradesh, Karnataka, Bengal and Maharastra.

English ► South Indian Mahua.

Siddha/Tamil ► Illupei, Elupa, Naatu Iluppai, Iruppai.

Folk ► Madhuulaka, Jala-Madhuuka, Jala-Mahuaa.

Action ► Same as that of *Madhuca indica*.

Seed kernel gave protobassic acid (a sapogenol) and two major saponins named Mi-saponins A and B and a minor one Mi-saponin C—all *bis*-desmosides of protobassic acid. Mi-saponins exhibit anti-inflammatory and antiulcerogenic activities.

Mahua oil causes total but reversible sterility in male rats as it shows testicular atrophy with degeneration of seminiferous tubules.

A related species, *Madhuca neriifolia* (Moon) H. J. Lam., synonym *Bassia neriifolia* Moon, *Bassia malabarica* Bedd. (known as Atta Illuppei in Tamil), is found in Western Ghats and coastal region of South India.

The flowers are used in renal diseases; fruits in rheumatism, cough, asthma and consumption; seed oil is used in rheumatism.

Maerua arenaria Hook. f. & Thoms.

Synonym ► M. oblongifolia (Forsk.) A. Rich.

Family ► *Capparidaceae.*

Habitat ► Punjab, Sind, Gujarat, Central and Southern India.

Ayurvedic ► Morata, Piluparni, Madhusravaa.

Siddha/Tamil ► Bhumichakkarai.

Folk ► Murhari.

Action ► Root—used for bleeding piles, as alterative in fevers; as a tonic in muscular debility.

(The root resembles liquorice root in appearance and taste.)

Magnolia grandiflora Linn.

Family ► *Magnoliaceae.*

Habitat ► Native to North America; found in the Himalayas and the Nilgiri hills up to 2,100 m.

English ► Bull Bay, Great Laurel Magnolia, Southern Magnolia.

Ayurvedic ► Him-Champaa.

Action ► Bark—anti-inflammatory, stimulant, diaphoretic. Wood—toxic. Plant is used against cold, headache and stomach-ache. Leaf extract—fungitoxic.

The leaves gave germacanolide lactones, a guaianolide (magnograndiolide, melampomagnolide A and B); the wood, quaternary aporphine alkaloids; bark, cyclocolorenone; root bark, eudesmanolides; seeds, phenolic constituents.

The sesquiterpene ketone, cyclocolorenone, also found in leaves, shows antifungal activity.

Magnolia pterocarpa Roxb., synonym *M. sphenocarpa* Roxb. (Vana-Champaa), Dhulichampaa) bark contains sesamin, eudesmin, fargesin, imperatorin, dimethyl-terephthalate and beta-sitosterol. Powdered bark is used for fevers and cough.

Mahonia napalensis DC.

Synonym ► *Berberis nepalensis* Spreng (in part).

Family ► *Berberidaceae.*

Habitat ► Temperate Himalayas from Garhwal to Bhutan at 1,350–2,700 m. and in Khasi Hills.

English ► Holly Leaved Berberry.

Folk ► Chhatri (Nepal), Haldia (Garhwal).

Action ► Used as Berberis. Antiprolific, antipsoriatic, alterative, demulcent, diuretic, antidysenteric.

The plant gave tertiary aporphines, berberine and jatrorrhizine.

Mallotus philippensis Muell.-Arg.

Family ► *Euphorbiaceae.*

Habitat ► Throughout tropical regions of India.

English ► Kamala tree, Monkey Face tree.

Ayurvedic ▶ Kampillaka, Kampilla, Karkash, Raktaanga, Rechan, Chandra.

Unani ▶ Kamilla, Kambilaa.

Siddha/Tamil ▶ Kapli, Kalupatti.

Action ▶ Gland and hair of fruit—purgative, anthelmintic, styptic. Used for the treatment of tapeworm infestation; in scabies, ringworm, herpes. Fruit—hypoglycaemic, spasmolytic, antibacterial.

Capsule hair and glands gave phloroglucinol derivatives; rottlerin, isorottlerin, iso-allorottlerin (the "red compound") and methylene-*bis*-methylphloroacetophenone (the "yellow compound"). The red powder, obtained from capsules, containing largely resinous matter, had lithotropic effect in rats, comparable to drugs used commonly against urinary calculi. Two more compounds designated as kamalins 1 and 2 have been isolated.

The stem bark contains kamaladiol-3-acetate and friedelin.

Dosage ▶ Glands and hairs of the fruit—0.5–1.0 g powder. (*API*, Vol.I.)

Malpighia glabra Linn.

Family ▶ *Malpighiaceae.*

Habitat ▶ Native to tropical America; cultivated in gardens as hedge.

English ▶ Barbados Cherry, Acerola.

Action ▶ Fruits—used in dysentery, diarrhoea and liver disorders. Fruits are rich in ascorbic acid (1,000–4,000 mg/100 g of edible pulp). The bark contains about 26% tannin. Fruits of Brazilian plant gave alpha-carotene, beta-carotene and beta-cryptoxanthine.

Malpighia punicifolia Linn.

Family ▶ *Malpighiaceae.*

Habitat ▶ Cultivated in Tamil Nadu and Karnataka.

English ▶ West Indian Cherry.

Folk ▶ Vallari (Telugu), Simeyaranelli (Kannada).

Action ▶ See Malpighia glabra.

Fruits contain ascorbic acid in high concentration (green fruits contain up to 3,000 mg/100 g). 3-methyl-3-buten-1-ol has been identified as major volatile constituent of the fruit.

Malus pumila Mill.

Synonym ▶ *M. domestica* Borkh. *M. sylvestris* Hort. non-Mill. *Pyrus malus* Linn. in part.

Family ▶ *Rosaceae.*

Habitat ▶ Native to Europe and West Asia; now cultivated in Himachal Pradesh., Kashmir, Kulu, Kumaon, Assam and in the Nilgiris.

English ▶ Cultivated Apple.

Ayurvedic ▶ Sinchitikaa.

Folk ▶ Seb, Sev.

Action ▶ Bark—anthelmintic, refrigerant, hypnotic, given in intermittent, remittent and bilious fevers. Leaves—inhibit the growth

of a number of Gram-positive and Gram-negative bacteria.

The fruit contains malic (90–95% of the total acids), citric, lactic and succinic acids; (unripe fruit contains quinic acid, citric acid, succinic acid, lactic acid); caffeic acid derivatives, pectins, minerals and vitamins.

Edible portion of fresh apple contains thiamine 0.12, riboflavin 0.03, niacin 0.2 and ascorbic acid 2 mg/100 g. The ascorbic acid content varies widely and values up to 40 mg/100 g. Sugars constitute about 80% of the total carbohydrates of ripe fruits—fructose (60), glucose (25) and sucrose (15%). The pectin content of the edible portion varies from 0.14 to 0.96% (as calcium pectate). The uronic acid content of apple pectin varies from 0.5 to 15%.

The astringent principles of apple include tannins, tannin derivatives and colouring materials (flavones). The browning of apple slices on exposure to air is due to enzymic oxidation of tannin compounds.

Fresh juice contains 0.20–0.80 malic acid, 11.6 total sugars and 0.021–00.080% tannin.

The seeds contain cyanogenic glycoside, amygdalin (0.62–1.38%, HCN equivalent, 0.037–00.087%).

Malva rotundifolia Linn.

Synonym ► *M. neglecta* Wall.

Family ► *Malvaceae.*

Habitat ► Simla, Kumaon and plains of North India.

English ► Round-leaved Mallow, Drawf Mallow, Cheese Cake Flower.

Ayurvedic ► Suvarchalaa.

Unani ► Khubhaazi, Gul-Khair.

Action ► Leaves—demulcent, emollient; used in glycosuria, stomach disorders and as emmenagogue; used as poultice for maturing abscesses. Seeds—demulcent; prescribed in bronchitis, cough, inflammation of the bladder and haemorrhoids.

Marshmallow (*Althaea officinalis*) is a different herb.

Malva sylvestris Linn.

Family ► *Malvaceae.*

Habitat ► Temperate Himalayas from Punjab to Kumaon, up to 2,400 m; Maharashtra, Karnataka and Tamil Nadu.

English ► Common Mallow, Blue Mallow, High Mallow.

Ayurvedic ► Suvarchalaa (var.).

Unani ► Khubbaazi, Bhubhaazi Bustaani, Gul-Khair.

Action ► Mucilaginous, emollient, laxative, antitussive, pectoral, antibacterial. Infusion is used for coughs and colds, irritation of the bronchi. Phagocyte stimulant.

Key application ► In irritation of the mucosa and throat and dry, irritative cough. (*German Commission E.*)

The herb contains sulphated flavonol glycosides, mucilage and tannins. Flowers contain malvin (an anthocyanin), malvidin diglucoside, tannins, carotene and ascorbic acid.

M

Malva coromandeliana Linn. (also *malvastrum*) is anti-inflammatory, pectoral, antidysenteric and diaphoretic.

Mandragora autumnalis Spreng.

Synonym ► *M. microcarpa* Bertol. *M. officinarum* Linn.

Family ► *Solanaceae.*

Habitat ► Mediterranean region.

English ► Mandrake.

Ayurvedic ► Wrongly equated with Lakshmanaa, a fertility promoting herb. (In Indian medicine, *Panax quinquefolium* Linn. and *Panax schinseng* Nees have been equated with Lakshmanaa.)

Action ► Anaesthetic, narcotic, poisonous. Alkaloid pattern similar to *Atropa belladona.* A sample of roots from Morocco contained atropine (0.2% at flowering stage).

In India, *Panax* sp. are perceived as fertility and vitality promoting herbs, which have been attributed to Lakshmanaa. Mandrake exhibits anticholinergic effects.

English Mandrake and American Mandrake are equated with *Bryonia alba* and *Podophyllum hexandrum* respectively.

Mangifera indica Linn.

Family ► *Anacardiaceae.*

Habitat ► Uttar Pradesh., Punjab, Maharashtra, Andhra Pradesh, West Bengal and Tamil Nadu.

English ► Mango.

Ayurvedic ► Aamra, Amb, Rasaal, Sahakaar, Pikavallabha, Madhudoot, Atisaurabha, Maakanda.

Unani ► Aam, Ambaj.

Siddha/Tamil ► Manga, Mau, Mamaram (bark), Mangottai Paruppu (seed).

Action ► Unripe fruit—astringent, antiscorbutic. Ripe fruit—invigorating and refrigerant in heat apoplexy. Leaves—anti-inflammatory, antibacterial, chloretic, diuretic. Used in diabetes, externally in burns and scalds. Kernel—astringent, anti-inflammatory, antibacterial, antifungal, anthelmintic, antispasmodic, antiscorbutic; given in diarrhoea, diabetes and menstrual disorders. Stem bark—astringent; used for haemorrhages, diarrhoea, rheumatism.

The Ayurvedic Pharmacopoeia of India recommends the dried seed in diarrhoea and dysentery; and the dried stem bark in genitourinary disorders.

Ripe mango contains sugars (9.5–18.6%), citric acid (0.12–0.34%), ascorbic acid (10.8–225.0 mg/100 g), carotenoids as beta-carotene (2,000–17,000 mcg/100 g). The fruit gave phenolic compounds (m-digallic acid, gallotannin, phloroglucinol, protocatechuic acid); flavonoids (1,2,3,4-tetrahydroxy benzene, kaempferol and myricetin).

The seed kernel contains alpha-and beta-amyrins, gallotannin, glucogallin and several sterols.

The leaves contain a pentacyclic triterpene alcohol, indicol, besides tarax-

one, taraxerol, friedelin, lupeol and beta-sitosterol. Leaves contain several sugars, free malic and citric acids and amino acids. Some esters of benzophenone C-glucosides and kinic and shikmic acids have also been reported. Mangiferin is present predominantly in the leaves and twigs.

The bark contains phenolic compounds (gallocatechin, protocatechuic acid), xanthones (homomangiferin), several triterpenoids and sterols.

All parts gave phenolic acids (ellagic acid, gallic acid, ethyl gallate); flavonoids (catechin), and xanthones (mangiferin).

Dosage ► Dried seed—1–2 g powder (*API,* Vol. I); stem bark—3–6 g powder, 25–50 g for decoction. (*API,* Vol. III.)

Manihot esculenta Crantz.

Family ► *Euphorbiaceae.*

Habitat ► Native to Brazil. Major crop in Kerala, Tamil Nadu and Andhra Pradesh.

English ► Manioc, Tapioca, Cassava.

Siddha/Tamil ► Maravalli kizhangu, Ezhalai kizhangu.

Folk ► Tapioca.

Action ► Staple food for poorer section of the population in many tropical countries. The starch is used for the manufacture of dextose, liquid glucose. The bitter variety is used for treating scabies and weeping skin.

The tuber is a good source of provitamin A carotenoids. It contains 0.1–3.0 mg/kg (fresh weight) of beta-carotene and 0.05–00.6 mg/kg (fresh weight) of lutein. The bitterness of the tuber is related to the cyanoglucoside content which ranges from 320 to 1,100 mcg cyanide/g in very bitter tubers and from 27.5 to 77.5 mcg is non-bitter tubers. Boiling, crushing and sun-drying reduce bitterness and also cyanoglucoside content. The tannin equivalent content in the clones varies from 0.31 to 0.34% and saponin equivalent varies from 0.18 to 0.29%.

Feeding tapioca significantly reduced the plasma cholesterol profile experimentally in cats and rats.

Manilkara kauki (L.) Dubard.

Synonym ► *Minusops Kauki* L.

Family ► *Sapotaceae.*

Habitat ► A native of Malaya; occasionally grown in gardens, especially in North India, Andhra Pradesh and Kerala.

English ► Kauki.

Ayurvedic ► Khirni.

Siddha ► Palai.

Action ► Root and bark—astringent. Given in infantile diarrhoea. Seed—febrifuge, anthelmintic, antileprotic. Leaf—used as poultice for tumours.

Seeds contain about 16% of fatty oil and 1% saponin.

Manilkara hexandra (Roxb.) Dubard, synonym *Mimusops hexandra* Roxb., found in central India and Deccan Peninsula, and cultivated throughout the greater part of India, is also equated with Khirni.

All parts gave taraxerol, a triterpene ketone, alpha-and beta-amyrin, cinnamates, alpha-sipnasterol, beta-sitosterol, its beta-D-glucoside, quercitol, quercetin and its dihydroderivatives, ursolic acid.

The bark contains 10% tannin.

Maranta arundinacea Linn.

Family ► *Marantaceae.*

Habitat ► Native to tropical America; cultivated throughout the country for its edible starch.

English ► Arrowroot.

Siddha ► Koovaikizhangu, Kookaineer.

Action ► Nutritive, demulcent (especially for infants and convalescence). Used as a dietary aid in acute diarrhoea and gastroenteritis. Used as a substitute for Bamboo-manna.

The rhizome contains about 25–27% neutral starch.

Marrubium vulgare Linn.

Family ► *Labiatae; Lamiacea.*

Habitat ► Native to Europe and Central Asia; also found in Kashmir.

English ► Horehound.

Unani ► Faraasiyun (wrongly equated with Valerian in *National Formulary of Unani Medicine*).

Action ► Expectorant, cholagogue; bitter tonic for stomach and liver, antispasmodic. Used for bronchitis, asthma, whooping cough, hard cough with little phlegm; also for cardiac extrasystols.

Key application ► In loss of appetite, dyspepsia; bloating and flatulence. (*German Commission E.*) *The British Herbal Pharmacopoeia* and The *British Herbal Compendium* (additionally) indicate its use for acute bronchitis, non-productive cough and catarrh and the respiratory tracts.

The herb yields a diterpenoid, premarrubiin, which generates marrubiin as an artefact; caffeic acid derivatives; and flavonoids—apigenin, apigenin-7-glucoside, luteolin, luteolin-7-glucoside, quercetin-3-glucoside and -3-rhamnoglucoside. The extracts of the herb exhibit anti-inflammatory and antiserotonin activity experimentally. Marrubiin is considered to be responsible for expectorant activity. It has also shown to normalize extrasystolic arrhythmias. High doses may cause cardiac irregularities.

The oil exhibits antimicrobial properties and is reported to be vasodilatory and hypotensive.

Marsdenia roylei Wight.

Family ► *Asclepiadaceae.*

Habitat ► Western and Eastern Himalayas, Simla and Kumaon, hills of Assam.

Ayurvedic ► Muurvaa (var.).

Folk ► Maruaa-bel. Khaarchu (Garhwal).

Action ► Root—purgative.

M. hamiltonii Wight (sub-Himalayan tract and adjacent plains of Uttar Pradesh and Bihar) has also been equated with a Muurvaa var. It is known as Moran-adaa in folk medicine.

Marsdenia tenacissima Wight & Arn.

Family ▶ *Asclepiadaceae.*

Habitat ▶ Himalayas from Kumaon to Assam, up to 1,500 m, Madhya Pradesh, Bihar, Deccan Peninsula.

English ▶ White Turpeth.

Ayurvedic ▶ Muurvaa, Atirasaa, Madhurasaa, Gokarni, Morataa, Madhulikaa, Suvaa, Devi, Tejani, Tiktavalli.

Siddha/Tamil ▶ Perunkurinjan.

Folk ▶ Maruaa-bel.

Action ▶ Root—purgative, antispasmodic, mild CNS depressant; used in colic.

Ayurvedic Pharmacopoeia of India recommends the bark in lipid disorders, also in polyuria and haemorrhagic diseases.

Roots and seeds are rich in pregnane glycosides of 2-deoxysugars, which on hydrolysis gave genins and sugars. Stem yielded tenacissosides A to E.

In folk medicine, the root is known as White Turpeth (Safed Nishoth). *Operculina turpethum* (Linn.) Silva Manso synonym *Ipomoea turpethum* R. Br. is the source of Turpeth (Nishoth) in Indian medicine.

Dosage ▶ Root—2–6 g powder, 10–20 g for decoction. (*API,* Vol.II.)

Marsilea minuta Linn.

Family ▶ *Marsileaceae.*

Habitat ▶ Throughout India as a weed in marshy places.

Ayurvedic ▶ Sunishannaka, Parnaka, Vastika-parnika, Swastika, Chatushpatri, Susunishaak, Chaupaitra.

Action ▶ Sedative. Used in insomnia and in the treatment of epilepsy and behavioral disorders.

The most active anti-epileptic principle is marsilin (1-triacontanol cerotate).

Dosage ▶ Whole plant—10–20 ml juice. (*CCRAS.*)

Martynia annua Linn.

Synonym ▶ *M. diandra* Glox.

Family ▶ *Martyniaceae.*

Habitat ▶ Native of Mexico; found throughout India.

English ▶ Devil's Claw, Tiger Claw.

Ayurvedic ▶ Kaakanaasikaa, Kaakaangi, Shirobal.

Siddha/Tamil ▶ Kakatundi, Thelkodukkukai.

Folk ▶ Hathajori, Bichhuu.

Action ▶ Leaf—used in epilepsy, also applied to tuberculous glands of the neck. Fruit—anti-inflammatory. Ash of the fruit, mixed with coconut

oil, is applied on burns. Seed oil—applied on abscesses and for treating itching and skin affections.

The Ayurvedic Pharmacopoeia of India recommends the seed for arresting greying of hair.

Flowers gave (several flavonoids including apigenin, luteolin, apigenin-7-O-beta-D-glucuronide, luteolin-7-O-beta-D-glucuronide, pellargonidin-3, 5-diglucoside, cyanidin-3-galactoside.

The essential oil from the plant moderately inhibited passive cutaneous anaphylaxis in animals.

Pentatropis microphylla W. & A. and *P. spiralis* Decne have also been equated with Kaakanaasaa, Kaakanaasikaa.

Dosage ► Dried seed—2–5 g. (*API*, Vol. III.)

Matricaria chamomilla Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native of Europe; grown in Jammu & Kashmir, Himachal Pradesh and Uttar Pradesh.

English ► German Chamomile, Chamomile. German chamomile flower is equated with *Matricaria recutita* L. (synonym *Chamomilla recutita* L.) and Roman Chamomile flower with *Anthemis nobilis* L. (synonym *Chamamaelum nobilis* L.)

Unani ► Baabunaa.

Action ► Sedative, anticonvulsant, carminative, antispasmodic, analgesic, anti-inflammatory, antiseptic. See also *Anthemis nobilis.*

Key application (German Chamomile)

► In inflammatory diseases of the gastrointestinal tract and gastrointestinal spasm. Externally, in skin, mucous membrane and ano-genital inflammation and bacterial skin diseases. (*German Commission E, The British Herbal Compendium.*) As anti-inflammatory and antispasmodic. (*The British Herbal Pharmacopoeia.*)

The flowers of German chamomile gave volatile oil up to about 2%, containing alpha-bisabolol up to 50%, azulenes including chamazulene, guiazuline and matricine; flavonoids including apigenin and luteolin and their glycosides, patuletin and quercetin; spiroethers; coumarins; polysaccharides.

The flowers are used as herbal tea for cough and cold and for promoting the flow of gastric secretion and bile. In chamomlile extracts, chamazulene has been found responsible for anti-inflammatory activity. Matricine and (−)-alpha-bisabolol also show anti-inflammatory and analgesic activity. Bisabolol exhibits ulceroprotective effect. Natural (−)-alpha-bisabolol has been shown to be significantly effective in healing burns; (−)-alpha-bisabolol, spiroethers and apigenin exhibit spasmolytic effect comparable with that of papaverine.

The polysaccharides are immunostimulating and activate macrophages and B lymphocytes; play an important role in wound healing.

Crude aqueous extract of the plant has been reported to significantly delay the onset of convulsions and reduce

mortality rate produced by picrotoxin experimentally.

Matthiola incana R. Br.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Native of Europe; grown as ornamental.

English ► Stock, Gilli-flower.

Unani ► Tudri Safed.

Action ► Expectorant, diuretic, stomachic.

The seeds contain mucilage, a fatty oil, two crystalline colouring matters and a volatile oil which yields methyl, isopropyl and 4-methylthiobutyl *iso*-thiocyanates. Beta-sitosterol is present in fatty oil. Fatty acids include palmitic, stearic, oleic, linoleic, linolenic and rucic.

Meconopsis aculeata Royle.

Family ► *Papaveraceae.*

Habitat ► Western Himalayas from Kashmir to Kumaon, between 3,300–4,500 m.

English ► Blue Poppy.

Folk ► Gul-e-Nilam (Kashmir), Gudi, Kunda, Kanderi (Punjab), Kalihaari (Himachal).

Action ► Plant—diuretic. Root—narcotic.

In Garhwal Himalayas, the whole plant is used as a blood purifier and to reduce blood pressure. The natives apply the plant paste externally in rheumatic pains as anodyne.

Meconopsis horridula Hook, known as Tasargaun in Tibet, is used for cardiac and respiratory disorder.

Meconopsis napaulensis DC., synonym *M. wallichii* HK. (temperate and alpine Himalaya from Nepal to Bhutan at 2,700–5,200 m) also exhibits narcotic properties. The roots gave alkaloids—protopine, magnoflorine, cryptopine, coptisine, allocryptopine, rhoeadine, papaverrubines E and D, corysamine and 2-methyl-6-methoxy-1,2,3,4-tetrahydro-beta-carboline.

Medicago sativa Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Punjab, Uttar Pradesh, Gujarat, Maharashtra, Tamil Nadu, West Bengal, as a farm crop.

English ► Alfalfa, Lucerne.

Ayurvedic ► Alfalfa, Vilaayati-gawuth, Lasunghaas, Lusan.

Unani ► Barsem.

Action ► Anticholesterolemic, rich in essential enzymes, minerals and vitamins; a preventive of high blood pressure, diabetes, peptic ulcer.

Alfalfa tea is used to strengthen the digestive system. Sprouts (of seeds) are used by diabetics.

The herb contains carotinoids (including lutein), triterpene saponins, isoflavonoids coumarins, triterpenes (including sitgmasterol, spinasterol); also cyanogenic glycosides (corresponding to less than 80 mg HCN/100 g); pro-vitamins A, B6, B12, D, K, E and P; calcium, phosphorus, iron,

potassium, magnesium, choline, sodium, silicon and essential enzymes.

The seeds contain 33.2% protein and 4.4% mineral matter; saponins with the aglycones, soyasapogenol B and E and polymines, diaminopropane and norspermine. Two storage globulins, alfin and medicagin are found in the seeds.

The flowers contain flavonoids, kaempferol, quercetin, myricetin and laricytrin. The fruits contain beta-amyrin, alpha- and beta-spinasterol, beta-sitosterol, stigmasterol, myrsellinol, scopoletin and esculetin.

The saponin, medicagenic acid, is found in leaves and roots (leaves 1.49%, roots 2.43% of dry matter).

Alfalfa seed extracts prevented hypercholesterolemia, triglyceridaemia and atherogenesis in cholesterol-fed rabbits and cynomologus monkeys. The saponins in the extract reduce intestinal absorption of cholesterol in rabbits.

Human trials have indicated the use of the herb in menopause. (Sharon M. Herr.)

Melaleuca leucadendron Linn.

Family ► *Myrtaceae.*

Habitat ► Indegenous to Burma, Cambodia, Thailand, Malay Peninsula to Australia; grown in Indian gardens and parks.

English ► Cajeput tree, Swamp Tea tree, White Tea tree.

Folk ► Kaayaaputi. (The oil of Cajeput is imported into India, chiefly from France and Netherlands.)

Action ► Oil—used as an expectorant in chronic laryngitis and bronchitis, and as a carminative. Acts as anthelmintic, especially against round worms. Enters into ointments for rheumatism and stiff joints, sprains and neuralgia, migraine, colds, influenza, and as a mosquito repellent.

Key application ► The oil is antimicrobial and hypermic *in vitro*. (*German Commission* .)

The oil contains terpenoids, 1,8-cineole (40–65%) as major component, with alpha-pinene, alpha-terpineol, nerolidol, limonene, benzaldehyde, valeraldehyde, dipentene and various sesquiterpenes; 3,5-dimethyl-4,6,di-O-methylphloroacetophenone.

The essential oil of *Melaleuca alternifolia* (Tea Tree Oil) is indicated for acne, tinea pedis and toe and nail onychomycosis on the basis of human trials. (Sharon M. Herr.)

Tea Tree Oil is distilled from the leaves of several species of Australian trees belonging the genus *Melaleuca,* principaly from *M. alternifolia.* Tea Tree Oil should contain a maximum of 15% 1,8-cineole and a minimum of 30% (+)-terpinen-4-ol, the principal germicidal ingredient. Other constituents, alpha-terpineol and linalool, also exhibit antimicrobial activity. (Cited in *Rational Phytotherapy.*)

The essential oil of *Melaleuca virdiflora* Solander ex Gaertner leaves, known as Niauli Oil, is used for catarrh of the upper respiratory tract. The oil is antibacterial and stimulatory to circulation *in vitro*. (*German Commission*

E.) Like cajeput oil, the principal constituent is cineole (eucalyptol).

A related species, *M. genistifolia,* indigenous to Australia, is grown in botanical gardens at Saharanpur and Lucknow (Uttar Pradesh). The leaves and terminal twigs yield 0.53% of a volatile oil which consists mainly of d-pinene, and about 2% cineole and traces of aldehyde.

Melastoma malabathricum Linn.

Synonym ▶ *M. normale* D. Don.

Family ▶ *Melastomataceae.*

Habitat ▶ Moist parts of India, up to 1,800 m.

English ▶ Indian Rhododendron.

Folk ▶ Laakheri, Paalorey (Maharashtra). Tulasi (Nepal). Nakkukappan (Tamil Nadu), Phutuka (Assam).

Action ▶ Leaf—antidiarrhoeal, antiseptic. Locally applied in smallpox to prevent pox-marks. Leaf and flowering top—astringent, antileucorrhoeic. Bark—applied to wounds. Also employed in preparation of gargles.

The leaves gave amino acids—glycine, valine, leucine, aspartic acid, glutamic acid, methionine, tyrosine, isoleucine and hydroxyproline. The roots gave beta-sitosterol and a triterpene, melastomic acid.

Melia azedarach Linn.

Family ▶ *Meliaceae.*

Habitat ▶ Cultivated and naturalized throuhout India. Wild in the Sub-Himalayan tract up to 1,800 m.

English ▶ Persian Lilac, Pride of India.

Ayurvedic ▶ Mahaanimba, Ramyaka, Dreka. (Neem is equated with *Azadirachta indica.*)

Unani ▶ Bakaayan.

Siddha/Tamil ▶ Malaivembu.

Action ▶ Leaf—diuretic, anthelmintic, antilithic. Leaf and flower—febrifuge, sedative, emmenagogue. Leaf, fruit and stem bark—antileprotic. Leaf, flower, fruit, root bark—deobstruent, resolvent. Seed oil—antirheumatic, insecticidal. Leaves, bark and fruit—insect repellent. Gum—used in spleen enlargement. Heartwood—an aqueous extract, used in asthma.

The Ayurvedic Pharmacopoeia of India indicated the use of the dried stem bark in increased frequency and turbidity of urine, skin diseases, nausea, emesis, asthma, gastroenteritis, giddiness and vertigo.

The bitter constituents are present exclusively in the pericarp, not in the kernel as in the case of Neem fruit. Bakayanin has been isolated from the pericarp (bitter in dilutions of 1 in 10,000).

The heartwood also yielded bakayanin and a lactone, bakalactone. Leaves gave quercitrin and rutin and tetranortriterpenoids, salanin and vilasinin.

An infusion of the bark is effective against ascariasis. The activity resides in the inner bark which is bitter but not

astringent (outer bark contains tannins and is astringent).

The ethanolic extract of the leaves is fungicidal and antibacterial. The activity is attributed to azadrine and meliotannic acid.

The fruits are considered poisonous to man and animals; contain melianoninol, melianol, melianone, meliandiol, vanillin and vanillic acid. Vanillic acid analogues show micro- and macro-filaricidal activity.

Gedunin, present in the plant, inhibits *Plasmodium falciparum,* while the seed extract does not show antimalarial activity against *P. berghei.*

The plant exhibited sedative and psychostimulant properties. Antitumour and antiviral activities have also been reported. Intraperitoneal administration of partially purified extracts of fresh green leaves reduced the spread of *Tacaribe virus* (that causes typical encephalitis) to kidneys, liver and brain in inoculated neonatal mice.

Dosage ► Stem bark—5–10 g (*API,* Vol. IV.); leaf, seed, root—50–100 ml decoction; 3–5 g powder. (*CCRAS.*)

Melia composita Willd.

Synonym ► *M. dubia* Hiern. non-Cav.

Family ► *Meliaceae.*

Habitat ► Eastern Himalayas, Assam, Western Ghats, Ganjam and Deccan up to 1,800 m.

English ► Hill Neem, Malabar Neem, Common Bead tree.

Ayurvedic ► Arangaka.

Folk ► Malaivembu (Tamil).

Action ► Fruit—anthelmintic; used in skin diseases.

The leaves and seeds gave tetranortriterpenoids, compositin and compositolide. The fruit gave salannin. The heartwood yielded a triterpenoid.

Tamil and Malyalam synonyms (Malaivembu and Malavembu) are common to *Melia azedarach* and *Melia composita.*

Melilotus alba Desr.

Family ► *Fabaceae.*

Habitat ► Native to Europe and Asia; grown in North India.

English ► White Sweet Clover.

Unani ► Ilkil-ul-Malik, Naakhunaa (white-flowered var.).

Action ► See *Melilotus indica*.

Melilotus indica (Linn.) All.

Synonym ► *M. parviflora* Desf.

Family ► *Paplionaceae; Fabaceae.*

Habitat ► Native to Eurasia; found as winter weed and cultivated for fodder in parts of Punjab, Haryana and Uttar Pradesh.

English ► Sweet Clover, Annual Yellow Sweet Clover, Small-flowered Melilot.

Ayurvedic ► Vana-methikaa.

Unani ► Ilkil-ul-Malik (yellow-flowered var.).

Folk ► Ban-Methi, Senji.

Action ► Plant—astringent, discutient, emollient. Used as poultice or plaster for swellings. The plant gave coumarins—fraxidin, herniarin, umbelliferone and scopoletin.

When fed alone as a green fodder, it exhibits narcotic properties; causes lethargy, tympanitis and is reported to taint the milk of dairy cattle. It may cause even paralysis. The plant contains 3-methoxyflavone, meliternatin which experimentally inhibited cell growth, induced granularity, retraction and then lysis of cells.

Melilotus officinalis Linn.

Family ► *Fabaceae.*

Habitat ► Ladakh, at 3,000–4,000 m, also cultivated.

English ► Yellow Sweet Clover, Melilot.

Unani ► Iklil-ul-Malik, Asaab-ul-Malik, Naakhunaa.

Action ► Plant—astringent, wound healer, styptic, anti-inflammatory, sedative, mild analgesic, anticoagulant, spasmolytic. Flower and leaf—diuretic, analgesic, anti-inflammatory, smooth muscle relaxant, vasodilator. Seed—used in cold.

Key application ► In chronic venous insufficiency. For supportive treatment of thrombophlebitis, haemorrhoids and lymphatic congestion. (*German Commission E.*) As venotonic, vulnerary. (*The British Herbal Pharmacopoeia.*)

The herb contains coumarin derivatives; flavonoid glycosides, including kaempferol and quercetin. Dicoumarol (melitoxin) is produced when fermentation takes place in melilot. Seeds gave canavanin and trigonelline. Reported poisonous to horses. The flowers contain the flavonoids, quercetin and myricetin besides kaempferol.

The herb has shown increase in venous reflux and improvement in lymphatic kinetics. Animal experiments show an increase in healing wounds. Flower and leaf extracts have shown analgesic activity, prolongation in pento-barbital-induced hypnosis time and smooth muscle relaxant activity in mice; also exhibited hypotensive and vasodilatory activity in rabbit. Dicoumarol is a potent anticoagulant.

In Europe and China, the plant extract is used for inflammations, arthritis, rheumatism, phlebitis, venous insufficiency, haemorrhoids, brachialgia and bronchitis.

The Red Clove is equated with *Trifolium pratense.*

Melissa axillaris (Benth.) Bakh f.

Synonym ► *M. parviflora* Benth.

Family ► *Lamiaceae.*

Habitat ► Temperate and alpine Himalaya, from Garhwal to Bhutan and in Darjeeling and Aka, Mishmi and Khasi hills at 1,000–3,600 m.

Unani ► Billilotan.

Action ► Carminative, diaphoretic, febrifuge in cases of catarrh and

influenza. The fruit is considered a brain tonic and useful in hypochondriac conditions.

The aerial parts of the plant yield 2% essential oil which is a good source of monoterpenic alcohols and aldehydes. It contains *d*-camphene 2.5, *dl*-alpha-pinene 2.3, *1*-beta-pinene 2.13, delta-carene 2.05, *d*-limonene 12.95, azulene 1.26, linalool 13.36, 1,8-cineole 9.33, citronellal 4.0, citronellol 8.2, citral 13.0, geraniol 21.01, neptalactone 1.91, thymol 4.0 and citronellic acid 2.0%.

The herb is used as a substitute for *Melissa officinalis* Linn.

M

Melissa officinalis Linn.

Family ► *Lamiaceae.*

Habitat ► Indigenous to the east Mediterranean region; introduced in India.

English ► Mountain Balm, Sweet or Lemon Balm.

Unani ► Baadranjboyaa, Billilotan. (*Nepeta cataria* Linn. and *Nepeta hindostana* Haines are also known as Billilotan.)

Action ► Antidepressant, antispasmodic, antihistaminic, antiviral. Used in anxiety neurosis and nervous excitability, palpitation and headache. Also in hyperthyroidism.

Key application ► In nervous sleeping disorders and functional gastrointestinal complaints. (*German Commission E, ESCOP.*) Externally for *Herpes labialis* (cold sores). (*ESCOP.*) As sedative and topical antiviral. (*The British Herbal Pharmacopoeia.*)

Only fresh (herb within 6 months after collection) is usable as a sedative, because of low volatile oil content and its high volatility.

The volatile oil of the herb (0.1–00.2%) consists mainly of geranial and neral, with caryophyllene oxide and smaller quantities of terpenes; glycosides of the alcoholic or phenolic components of the volatile oil (including eugenol glucoside); caffeic acid derivatives (rosmaric acid); flavonoids (including cymaroside, cosmosiin, rhamnocitrin, isoquercitrin); triterpene acids (including ursolic acid).

Hot water extracts exhibit antiviral properties, mainly due to rosmaric acid and other polyphenols. (A cream containing the extracts of Balm is used for the treatment of cutaneous lesions of *Herpes simplex* virus.) Aqueous extracts inhibit tumour cell dividing.

Freeze-dried aqueous extracts inhibit many of the effects of exogenous and endogenous thyroid stimulating hormones (TSH) on bovine thyroid gland by interfering with the binding of TSH to plasma membranes and by inhibiting the enzyme iodothyronine deiodinase *in vitro*.

The anti-hormonal, mainly anti-thyroid effects of Balm are well documented. (*Potter's New Cyclopedia,* Sharon.M. Herr.)

For mild to moderate Alzheimer disease, 60 drops per day of standardized Lemon Balm extract (1 : 11 45% alcohol) was prescribed daily. Results were encouraging. (*J Neurol Neurosurg*

Psychiatry, 74, 2003; *Natural Medicines Comprehensive Database,* 2007.) (For cholinergic activity, *BMJ,* 325, 2002, 1312–1233.)

Melochia corchorifolia Linn.

Family ► *Sterculiaceae.*

Habitat ► Kumaon to Sikkim, Gujarat and Peninsular India.

Siddha/Tamil ► Pinnakkuppundu.

Folk ► Chunch, Bilpat.

Action ► Leaf and root—antidysenteric. Leaf—applied as poultice for swellings of abdomen and sores.

The leaves gave flavonol glycosides, cyclopeptide alkaloids. The triterpenoids and steroids, isolated from the aerial parts, are friedelin, beta-sitosterol and its beta-D-glucoside and stearate.

Melothria maderaspatana (L.) Cogn.

Synonym ► *Cucumis maderaspatana* Linn.
Bryonia scabrella Linn. f.
Mukia scabrella (Linn. f.) Arn.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India, ascending up to 1,800 m in the hills.

Ayurvedic ► Ahilekhana, Trikoshaki.

Siddha/Tamil ► Musumsukkai.

Folk ► Agmaki.

Action ► Tender shoots—gentle aperient, diuretic, stomachic; decoction used in biliousness and flatulence.

The root contains columbin; seed oil gave linoleic, oleic and palmitic acids. Fresh aerial parts exhibit potent antihepatotoxic activity.

In carbon tetrachloride-induced liver dysfunction in albino rats, the recovery of liver, treated with the extract from aerial parts, was significant and there was marked decrease in serum levels of the enzymes, alanine, aminotransferase, aspartate aminotransferase and alkaline phosphatase.

Kuruvikizhangu of Siddha medicine, used for acute diarrhoea and fever, is equated with *Malothria perpusilla* (Blume) Cogn. *Zehneria hookeriana* Arn., found in upper Gangetic plain from Nepal to Assam and in Peninsular India.

Memecylon edule Roxb.

Synonym ► *M. umbellatum* Burm. f.

Family ► *Melastomataceae.*

Habitat ► Orissa, Assam and Western Peninsula.

English ► Iron Wood.

Ayurvedic ► Anjani.

Siddha/Tamil ► Kasai, Anjani.

Folk ► Yaalki, Lokhandi (Maharashtra).

Action ► Fruit and leaf—astringent. Leaf—antileucorrhoeic, spasmolytic, hypoglycaemic. A lotion prepared from the leaves is used in ophthalmia. Root—used in excessive menstrual discharge.

Aerial parts gave umbelactone, beta-amyrin, ursolic acid, oleanolic acid, sitosterol and its glucoside.

Mentha aquatica Linn.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Cultivated in Indian gardens.

English ▶ Water Mint, Wild Mint.

Unani ▶ Pudinaa Nahari.

Action ▶ Leaf—stimulant, astringent. Used for diarrhoea and dysmenorrhoea.

The essential oil is composed of 40–50% menthofuran, with menthol, methyl acetate, pulegone among other constituents.

Mentha arvensis Linn. var. piperascens Holmes.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Cultivated in Jammu and Kashmir.

English ▶ Japanese Mint.

Unani ▶ Naanaa.

Action ▶ Carminative, cholagogue, expectorant, antibacterial, antifungal.

Key application ▶ Mint oil—internally for flatulence, functional gastrointestinal and gallbladder disorders; catarrhs of the upper respiratory tract. Externally, for myalgia and neuralgia. (*German Commission E.*)

Major components of the essential oil are menthol (up to 95%) and menthone. Others are alpha-and beta-pinene, alpha-thujene, *l*-limonene, beta-phellandrene, furfural, methylcyclohexanone and camphene. The essential oil possesses both antibacterial and antifungal properties.

The leaves show anti-implantation effect. Seeds showed abortifacient activity (29%) in albino rats with marked malformations in neonates where pregnancy was not terminated.

Mentha longifolia (Linn.) Huds.

Synonym ▶ *M. sylvestris* Linn.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Native to Europe and Asia; cultivated in Kashmir, Maharashtra, Uttar Pradesh and Punjab.

English ▶ English Horsemint.

Unani ▶ Pudinaa-Barri, Jangali Pudinaa.

Action ▶ Leaf and flowering top—carminative, stimulant, antiseptic, febrifuge. Used for digestive disorders and headaches. Essential oil—antibacterial.

Chief components of the volatile oil are 1,8-cineole 28.8, piperitone 13.9, *cis*-piperitone oxide 15.4 and piperitenone 13.8%. The aerial parts contain flavonoids—3′-hydroxy-4′,5,6,7-tetramethoxyflavone, hesperetin-7-rutinoside, luteolin, ursolic acid and beta-sitosterol. The essential oil acts as a CNS depressant and has somnifacient properties. Phenolic extract showed

stimulative effect on CNS of mice. Administration of the oil leads to a drop in body temperature.

American Horsemint is equated with *Monarda punctata* L. The major component of the volatile oil is thymol. The leaves and tops are used as stimulant, carminative and emmenagogue.

Mentha piperata
Linn. emend. Huds.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to Europe; cultivated in Maharashtra, Kashmir and Punjab.

English ► Peppermint, Brandy Mint.

Ayurvedic ► Vilaayati Pudinaa.

Action ► Oil—digestive, carminative, chloretic, antispasmodic, diuretic, antiemetic, mild sedative, diaphoretic, antiseptic, antiviral, used in many mixtures of indigestion and colic and cough and cold remedies.

Key application ► Leaf—internally for spastic complaints of the gastrointestinal tract, gallbladder and bile ducts. (*German Commission E, ESCOP.*) *The British Herbal Compendium* indicates peppermint leaf for dyspepsia, flatulence, intestinal colic, and biliary disorders.

Key application ► Oil—as a carminative. (*The British Herbal Pharmacopoeia.*) In spastic discomfort fo the upper gastrointestinal tract and bile ducts, irritable colon, the respiratory tract and inflammation of the oral mucosa. Externally, for myalgia and neuralgia. (*German Commission E.*) *ESCOP* indicates its use for irritable bowel syndrome, coughs and colds. Externally, for coughs and colds, rheumatic complaints, pruritus, urticaria, and pain in irritable skin conditions. (*ESCOP.*)

The essential oil has both antibacterial and antifungal properties.

The major constituents of the essential oil are: menthol, menthone, pulegone, menthofuran, 1,8-cineole, menthyl acetate, isomenthone. The leaves contain flavonoid glycosides, eriocitrin, luteolin 7-O-rutinoside, hesperidin, isorhoifolin, diosmin, eriodictyol 7-O-glucoside and narirutin, besides rosmarinic acid, azulenes, cholene, carotenes.

Peppermint oil relaxed carvachol-contracted guinea-pig tenia coli, and inhibited spontaneous activity in guinea-pig colon and rabbit jejunum. It relaxes gastrointestinal smooth muscle by reducing calcium influx. Peppermint oil reduced gastric emptying time in dyspeptics.

The aqueous and ethanolic extracts exhibited antiviral activity against RPV (rinder pest virus), a highly contagious viral disease of cattle.

Mentha spicata
Linn. emend. Nathh.

Synonym ► *M. viridis* Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Cultivated in Punjab, Uttar Pradesh and Maharashtra.

English ► Spearmint, Garden Mint.

Ayurvedic ► Pudinaa, Podinaka, Puutihaa, Rochini.

Unani ► Nanaa. Pudinaa Kohi.

Action ► Carminative, stimulant, antispasmodic, antiemetic, diaphoretic, antiseptic. A tea of dry flowers and leaves is prescribed for tracheobronchitis and hypertension.

The chief constituents of the essential oil are carvone (55–75%) and limonene (up to 21.4%). The herb gave flavonoids, diosmin and diosmetin. Caffeic acid derivatives include rosmarinic acid in the volatile oil.

Dosage ► Leaf—5–10 ml juice; 3–5 ml extract. (*CCRAS.*)

M

Menyanthes trifoliata Linn.

Family ► *Gentianaceae.*

Habitat ► Native to Britain and Europe; found in Kashmir.

English ► Bogbean, Buckbean, Goat's bean, Marsh Trefoil.

Folk ► Buckbean.

Action ► Bitter tonic, deobstruent. Laxative in large doses. Used for diseases of liver and gallbladder, and rheumatism. (Contraindicated in diarrhoea, dysentery and colitis.)

Key application ► Leaf—in loss of appetite, peptic discomforts. (*German Commission E.*) As a bitter tonic. (*The British Herbal Pharmacopoeia.*) The drug stimulates saliva and gastric juice secretion. (*German Commission E.*)

The herb contains iridoid glycosides, foliamenthin, dihydrofoliamenthin, menthiafolin and loganin; pyridine alkaloids including gentianine; coumarins (scopoletin); phenolic acids (caffeic, with protocatechuic, ferulic, sinapic, vanillic including others; flavonoids including rutin, hyperoside.

Choleretic action of the herb is attributed to the synergistic action of caffeic and ferulic acids and iridoid glycosides.

Scoparone and scopoletin (coumarins isolated from the aerial parts) exhibit antihepatotoxic, choleretic and cholagogue properties.

The rhizomes contain dihydrofoliamenthin, loganin, menthiafolin and a triterpenoid saponin menyanthoside. Aqueous extract of the rhizome showed greater preserved renal function and higher glomerular filtration rate, possibly due to Platelet Activating Factor (PAF)-antagonistic effect of the extract.

Merremia quinquefolia (Linn.) Hallier f.

Family ► *Convolvulaceae.*

Habitat ► Maharashtra, Gujarat, Uttar Pradesh, Orissa, Rajasthan.

Action ► Seeds—sedative.

The seeds contain ergoline alkaloids. The alkaloids are reported to produce vasoconstrictor, uterotonic, neurohormonic, sympathicolytic and sedative effects.

Plants of *Merremia* sp. are twiners and are used as diuretic, deobstruent, antirheumatic and alterative; the root

is used as a mouthwash; leaves are used for burns, scalds and sores. *M. vitifolia* (Burm. F.) Hallier f. exhibits potent diuretic and antiseptic activity in strangury and urethral discharges.

(Most of the twiners are known as Prasaarini in Indian medicine and are specific for rheumatic affections.)

Merremia tridentata (Linn.) Hallier. f.

Synonym ► *Convolvulus tridentatus* Linn.
Ipomoea tridentata (L.) Roth.

Family ► *Convolvulaceae.*

Habitat ► Upper Gangetic Plain, Bihar, Orissa, West Bengal, South India and Gujarat.

Ayurvedic ► Prasaarini (Kerala and Karnataka), Tala-nili.

Siddha/Tamil ► Mudiyaakunthal.

Action ► Laxative, astringent, anti-inflammatory. Used in piles, swellings, rheumatic affections, stiffness of the joints, hemiplegia and urinary affections.

The aerial parts contain the flavonoids, diometin, luteolin and their 7-O-beta-D-glucosides.

Mesua ferrea Linn.

Synonym ► *M. nagassarium* (Burm. f.) Kosterm.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Eastern Himalayas, Assam, West Bengal, Western Ghats, Travancore and the Andaman Islands.

English ► Iron-wood, Mesu.

Ayurvedic ► Naagakeshara, Naagapushpa, Chaampeya, Naaga, Naagakinjalika, Ahipushpa. (In *Ayurvedic Formulary of India* Part I, revised edn 2003, Keshara and Kesara are equated with *Mesua ferrea,* while Kumkuma is equated with *Crocus sativus.*)

Unani ► Naarmushk.

Siddha/Tamil ► Sirunagappo, Nagakesaram. Sirunagappo also consists of the tender fruits of *Cinamonum wighti* Meissn. Malabar Naagakeshar consists of the fruits of *Dillenia pentagyna* Roxb.

Action ► Flower bud—antidysenteric. Flowers—astringent, haemostatic, anti-inflammatory, stomachic. Used in cough, bleeding piles, metrorrhagia. Essential oil from stamens—antibacterial, antifungal.

The Ayurvedic Pharmacopoeia of India recommends the use of dry stamens in gout, haemorrhagic disorders and diseases of the urinary bladder.

The heartwood gave xanthones—euxanthone, mesuaxanthones A and B, which exhibit anti-inflammatory, CNS depressant and antimicrobial activities.

The seed oil gave 4-phenyl coumarin analogues—mesuol, mammeigin, mesuagin, mammeisin and mesuone. Phenol-containing fraction of seed oil is antiasthmatic and antianaphylaxis.

Stamens gave alpha- and beta-amyrin, beta-sitosterol, biflavonoids, mesuaferrones A and B, and mesuanic

M

acid. Stamens constitute the drug Naagakeshar of Indian medicine, used as an astringent, haemostatic, particularly in uterine bleeding and renal diseases.

Ethanolic extract of the plant showed diuretic and hypotensive activity.

Dosage ► Dried stamens—1–3 g powder. (*API*, Vol. II.)

Meyna laxiflora Robyns.

Synonym ► Vangueria spinosa Hook. f.

Family ► *Rubiaceae.*

Habitat ► West Bengal, Bihar, Orissa, in hedges and waste places.

Ayurvedic ► Pinditaka. Madana or Mainphala is a misleading synonym. It is equated with *Randia dumetorum* Poir.

Folk ► Muyana, Moyana, Muduna.

Siddha/Tamil ► Manakkarai. (Madana or Mainphala is known as Marukkallankay.)

Action ► Fruit—cholagogue, a decoction used in biliary complaints and hepatic congestion. Dried fruits—narcotic; used for boils.

Michelia champaca Linn.

Family ► *Magnoliaceae.*

Habitat ► Eastern Himalayas, lower hills of Assam, hills of South India up to 1,000 m., cultivated in various parts of India.

English ► Champak, Golden Champa.

Ayurvedic ► Champaka, Svarna Champaka, Hemapushpa, Chaampeya.

Siddha/Tamil ► Sampagi.

Action ► Flowers—bitter, carminative, antispasmodic, demulcent, antiemetic, diuretic (used for dysuria), antipyretic. Fruits—used for dyspepsia and renal diseases. Bark—stimulant, diuretic and febrifuge. Dried root and root bark—purgative and emmenagogue. Externally—flower oil is used as an application in cephalalgia, gout and rheumatism; fruits and seeds for healing cracks in feet.

The ethanolic extract of the stem bark showed hypoglycaemic activity in rats. The benzene extract of the anthers showed 67% post-coital anti-implantation activity in rats (1000 mg/kg per day).

Stem bark and roots yielded an alkaloid liriodenine. Root bark yielded sesquiterpene lactones (including parthenolide and micheliolide). Leaves gave a polyisoprenoid, beta-sitosterol and liriodenine. Mono-and sesquiterpenes occur in essential oils isolated from the flowers, leaf and fruit ring.

The bark and root cortex of the Chinese plant gave magnosprengerine (0.41%) and salicifoline (0.39%). These active principles showed lasting muscle relaxant and hypotensive activity.

The bark of *Michelia montana* Blume (Eastern Himalayas and hills of Assam)

is used as a bitter tonic in fevers. It bears white and fragrant flowers. The leaf and stem yield an essential oil, 0.95 and 0.36% on fresh basis, respectively. The flowers contains 75% safrole and the latter 76% sarisan.

Michelia nilgarica Zenk. (Western Ghats, above 1,700 m) is known as Kattu-sambagam in Tamil Nadu, the yellow-flowered var. of Champaa. The bark and leaves are considered febrifuge. The bark contains a volatile oil, acrid resins, tannin and a bitter principle. The flowers yield a volatile oil similar to the bark oil. Aerial parts exhibit diuretic and spasmolytic activity.

Dosage ► Dried buds and flowers—1–3 g powder. (*API,* Vol. IV.) Bark—50–100 m decoction. (*CCRAS.*)

Microcos paniculata Linn.

Synonym ► *Grewia microcos* Linn. *G. ulmifolia* Roxb.

Family ► *Tiliaceae.*

Habitat ► North-eastern parts of India, West Bengal, Western Ghats and Andaman Islands.

Folk ► Asar (Bengal); Thengprenkeorong (Assam); Kadambu, Visalam, Kottei (Tamil Nadu); Abhrangu (Karnataka).

Action ► Plant—stomachic, antidysenteric, antisyphilitic, antibacterial (also used for smallpox and eczema).

Microglossa pyrifolia (Lamk.) Kuntze.

Synonym ► *M. volubilis* DC.

Family ► *Asteraceae, Compositae.*

Habitat ► North-eastern Indian hills.

Action ► Leaf—used for ringworm of the scalp.

A acetylenic glucoside, isolated from the leaf, showed antibacterial activity against *Pseudomonas aeruginosa* and *Staphylococcus aureus.*

Micromelum integerrimum (Buch-Ham.) Roem.

Family ► *Rutaceae.*

Habitat ► Bihar, Orissa, Bengal, Sikkim, Nepal, Assam, Khasi, Aka and Lushai hills.

Action ► Bark of the root, stem and branches—used in the treatment of tubercular cases.

The root contains coumarins, micromelin, phebalosin and yuehchakene.

Micromelum pubescens Blume, synonym *M. minutum* (Forst. f.) Seem. is found in the Andamans. The plant is used in Malaya and Indonesia for phthisis and chest diseases. The root is chewed with betel for coughs.

The leaves contain coumarins, micropubescin and phebalosin.

The bark contains phebalosin. The roots contain micromelumin, phebalosin, imperatorin, angelical, limettin, scopoletin, minumicrolin and murrangatin.

Micromeria capitellata Benth.

Family ► *Lamiaceae; Labiatae.*

Habitat ► Kumaon, Upper Gangetic plain, Bihar, Orissa, Western Ghats, Nilgiris.

Folk ► Pudinaa (var.).

Action ► Plant—carminative. Used as a substitute for *Mentha piperata* Linn.

The plant yields an essential oil (1.6%) which contains mainly pulegone (80%).

Micromeria biflora Benth., equated with Indian Wild Thyme, is found in tropical and temperate Himalayas, and in Western Ghats and hills of South India.

The principal constituent of volatile oil of *Camphorata* sp. is camphor; of *Citrata* sp. is citral; of *menthata* and *Pulegata* sp. is *d*-menthone; and pulegone.

M

Microstylis musifera Ridley.

Synonym ► *Malaxis muscifera* (Lindley) Kuntz.

Family ► *Orchidaceae.*

Habitat ► Northern Himalayas at altitudes of 1,500 to 2,800 m.

Ayurvedic ► Jivaka, Madhura, Shranga, Hriswaanga, Kurcha, Shirraka. (Substitute: *Pueraria tuberosa.*)

Action ► Rejuvenating tonic.

Dosage ► Tuber—3–6 g power (*CCRAS.*)

Microstylis wallichii Linn.

Synonym ► *Malaxis acuminata* D. Don

Family ► *Orchidaceae.*

Habitat ► Northern Himalayas at altitudes of 1,500 to 2,800 m.

Ayurvedic ► Rshabhaka, Rshabha, Rshabham, Vrishabh, Dhira, Vishani. (Substitute: *Pueraria tuberosa.*)

Action ► Rejuvenating tonic.

Dosage ► Tuber—3–6 g powder. (*CCRAS.*)

Mikania cordata (Burm.) B. L. Robinson.

Synonym ► *M. micrantha* Kunth. *M. scandans* Hook. f. non-Willd.

Family ► *Asteraceae; Compositae.*

Habitat ► West Bengal, eastern Assam, as a weed in tea gardens; sal and other forests and waste lands. Distributed in tropical America, Africa and Asia.

Folk ► Mikaaniaa.

Action ► Root—anti-inflammatory, hepatoprotective, adaptogenic.

Stigmasterol, beta-sitosterol and sesquiterpene dilactones, mikanolide, dihydromikanolide, deoxymikanolide and scandenolide have been isolated from the weed.

The root extract exhibited anti-inflammatory activity; reduced carrageenan-induced paw oedema in experimental rats.

The methanolic extract of the root showed CNS deperssant action. It showed reduction in spontaneous motility, hypothermia, potentiation of pentobarbitone sleeping time, analgesia, suppression of aggressive behaviour and antagonism to amphetamine toxicity on experimental animals.

The methanolic extract of the root exhibited adaptogenic activity against a variety of stress-induced effects in albino rats.

The chemoprotective, anticarcinogenic and hepatoprotective effect of the methanolic extract of the root were also evaluated in animal studies. Chemical carcinogens were reduced in the liver of rats treated with the plant extract. The root extract induced recovery from carbon tetrachloride-induced damage to liver tissues in mice.

Miliusa velutina Hook. f. & Thoms.

Family ► *Annonaceae.*

Habitat ► Sub-Himalayan tract and outer Himalayas, in North-east and Central India, eastern coast of Deccan Peninsula.

Ayurvedic ► Rshiyaproktaa.

Folk ► Gandha-Palaasa (Orissa), Kaari (gum).

Action ► Bark—used in the treatment of gout.

Millettia auriculata Baker ex Brandis.

Synonym ► *M. extensa* Benth. ex Baker.

Family ► *Fabaceae.*

Habitat ► Sub-Himalayan tract and outer Himalaya up to 1,200 m from Kashmir to Bhutan and in Assam and Central and Southern India.

Folk ► Godaar (Bihar).

Action ► Root—vermifuge, pesticidal, kills lice and ticks.

The roots, leaves and stems gave *iso*-flavones (including *iso*-auriculatin, auricularin) and a rotenoid, sumatrol.

Millettia racemosa Benth.

Family ► *Fabaceae.*

Habitat ► Deccan Peninsula.

Folk ► Godaar (Bihar).

Action ► Insecticidal.

The debarked stem contains isoflavans, isomillinol, besides behenic acid, beta-amyrin and beta-sitosterol. The isoflavans showed bactericidal and insecticidal activity. The antibacterial activity was observed against *Staphylococcus aureus* and *E. coli.*

Millingtonia hortensis Linn. f.

Family ► *Bignoniaceae.*

Habitat ► Cultivated throughout India.

English ► Indian Cork tree.

Siddha/Tamil ► Maramalli.

Folk ► Aakaasha Neem, Neem-Chameli.

Action ► Bark—antipyretic. Flowers—used for asthma and sinusitis.

The butanol soluble fraction from aqueous extract of flowers showed bronchial smooth muscle relaxant property. Hispidulin, isolated from the flowers, is reported to exhibit bronchodilatory and antiphlogistic activities. Hispidulin is found to be more potent than aminophyllin and less toxic than the crude extract.

Mimosa pudica Linn.

Family ► *Mimosaceae.*

Habitat ► Native to tropical America; naturalized in tropical and subtropical regions of India.

English ► Sensitive-plant, Humble-Plant.

Ayurvedic ► Lajjaalu, Laajavanti, Namaskaari, Samangaa, Sankochini, Shamipatraa, Khadirkaa, Raktapaadi.

Unani ► Chhuimui, Sharmili, Laajwanti.

Siddha/Tamil ► Thottalsurungi.

Action ► Leaf—astringent, alterative, antiseptic, styptic, blood purifier. Used for diarrhoea, dysentery, haemophilic conditions, leucorrhoea, morbid conditions of vagina, piles, fistula, hydrocele and glandular swellings. Root—used in gravel and urinary complaints. A decoction is taken to relieve asthma.

The plant contains mimosine and turgorin. The periodic leaf movements exhibited by the plant are due to presence of derivatives of 4-O-(beta-D-glucopyranosyl-6′-sulphate) gallic acid. The aerial parts of the plant contain C-glycosylflavones, 2″-O-rhamnosylorientin and 2″-O-rhamnosylisoorientin.

Dosage ► Whole plant, root—10–20 ml juice; 50–100 ml decoction. (*CCRAS.*) Whole plant—10–20 g for decoction. (*API,* Vol. II.)

Mimusops elengi Linn.

Family ► *Sapotaceae.*

Habitat ► Cultivated in North India, Western Peninsula and South India.

English ► Spanish-Cherry, West Indian Medlar, Bullet Wood.

Ayurvedic ► Bakula, Keshara, Simhakeshara, Sthiraa, Sthirapushpa, Vishaarada, Dhanvi, Madhupushpa, Madhugandha, Chirpushpa, Maulsiri.

Unani ► Molsari.

Siddha ► Magilam.

Action ► Pulp of ripe fruit—astringent; used in chronic dysentery. Flowers, fruit and bark—astringent. Bark—given for promoting fertility in women. Seeds—purgative. The leaves contain sterols, reducing sugars and tannins; roots, a steroidal saponin; stem bark, spinasterol and taraxerol; flowers, D-mannitol, beta-sitosterol and beta-sitosterol-D-glycoside; seeds, pentacyclic triterpene acids, mimusopic and mimusopsic acids.

Essential oil obtained from the plant is reported to be mycotoxic. Antimicrobial activity of the root extract has

been reported. Saponins isolated from the seeds have been found to effect the cardiovascular activity in dogs and haemolytic activity in human beings. Spasmolytic activity in isolated ileum of guinea-pigs has also been recorded. Saponins from seeds also showed spermicidal activity.

Dosage ► Seed, bark—10–20 g paste; 50–100 ml decoction. (*CCRAS*.)

Mirabilis jalapa Linn.

Family ► *Nyctaginaceae.*

Habitat ► North-West Himalayas, Bengal and Manipur.

English ► Four-O'Clock Plant, Marvel of Peru.

Ayurvedic ► Trisandhi.

Unani ► Gul-abbaas.

Siddha/Tamil ► Andhimalligai.

Action ► Leaf—used for treating uterine discharge; as poultice for abscesses and boils; fresh juice is applied to body in urticaria, also for inflammations and bruises. Tuber—used as a poultice on carbuncles. Root—mild purgative, spasmolytic.

The tuberous roots were erroneously thought to be the source of jalap.

The plant is used for its antitumour and virus-inhibitory activity.

The plant contains triterpenes, alpha-amyrin and its acetate. Mirabilis Antiviral Protein (MAP) was isolated from the tuberous roots. MAP also showed antiproliferative effect on tumour cells. (MAP is abortifacient.) Two Mirabilis jalapa antimicrobial proteins, Mj-AMP-1 and Mj-AMP-2, isolated from seeds, showed broad spectrum antifungal actvity involving a number of pathogenic fungi.

Miraxanthins I, II, III and IV, indicaxanthin and vulgaxanthin have been isolated from flowers.

Mitragyna parvifolia
(Roxb.) Korth.

Family ► *Rubiaceae.*

Habitat ► All over India, and up to 1,200 m in the outer Himalaya.

English ► Kaim.

Ayurvedic ► Giri-kadamba, Kadamba (var.).

Siddha ► Chinna-Kadambu.

Action ► Bark—used for muscular pain. Bark and root—febrifuge, antispasmodic.

Both indole and oxindole alkaloids have been isolated from the plant. (The composition of alkaloids varies with season and from place to place.) The main indole alkaloid reported is akuammigine and oxindole alkaloids have been identified as mitraphylline, isomitraphylline, pteropodine, isopteropodine, speciophylline and uncarine F.

Anthocephalus cadamba Miq. is the accepted source of Kadamba.

Mollugo cerviana Ser.

Family ► *Aizoaceae; Molluginaceae.*

Habitat ► Upper Gangetic Plains, Punjab, Delhi, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Orissa, Tamil Nadu, Karnataka.

Ayurvedic ► Parpata (substitute). Grishma-Sundara.

Siddha/Tamil ► Parpaatakam.

Folk ► Jeem Shaak.

Action ► Plant—stomachic, aperient, febrifuge, antiseptic, blood purifier (used for venereal diseases), emmenagogue. Root—used in rheumatism and gout.

Flowers and shoots—diaphoretic, given in fevers. An infusion of the plant is given to promote lochial discharge.

The plant contains orientin (leteolin-8-C-glucoside), vitexin (apigenin-8-C-glucoside) and their 2′′-O-glucosides. The plant is cardiostimulant, also antibacterial.

Mollugo spergula Linn.

Synonym ► *M. oppositifolia* Linn. *Glinus oppositifolius* (Linn.) A. DC.

Family ► *Aizoaceae, Molluginaceae.*

Habitat ► Greater part of India, especially in Assam, Bengal and Deccan Peninsula.

Ayurvedic ► Grishma-sundara, Parpata (Kerala).

Siddha/Tamil ► Thurapoondu.

Folk ► Jala-papr (Bihar), Jeem Shaak.

Action ► Plant—stomachic, aperient and antiseptic. Used as a bitter tonic for liver disorders.

Aerial parts gave vitexin, vitexin-7-glucoside and 2′′-*p*-coumaroylvitexin-7-glucoside.

Mollugo stricta Linn., synonym *M. pentaphylla* Linn. (throughout the plains and Ghats of India), is also known as Parpatakam in the South, Jala-papr in Bihar and Kharas in Maharashtra. The plant is stomachic, aperient, emmenagogue and antiseptic. Its biological activity is spermiostatic.

Momordica balsamina Linn.

Family ► *Cucurbitaceae.*

Habitat ► Punjab, Gujarat, Dehra Dun and Andhra Pradesh.

English ► Balsam Apple.

Ayurvedic ► Jangali Karelaa.

Folk ► Mokhaa. Chhochhidan (Gujarat).

Action ► Fruit—applied to burns, haemorrhoids and chapped hands. Internally, cathartic, hypoglycaemic.

The plant contains a ribosome inactivating protein, momordin II. Methanolic extract of the aerial parts contains phenylpropanoid esters, verbascoside, calceolarioside and rosmarinic acid. The esters exhibited antihypertensive, analgesic and antibacterial activities.

Momordica charantia Linn.

Family ► *Cucurbitaceae.*

Habitat ► Cultivated all over India for its fruits.

English ► Bitter Gourd, Blsam Pear, Carilla.

Ayurvedic ► Kaaravellaka, Kaaravella, Kaathilla, Sushaavi.

Unani ► Karelaa.

Siddha/Tamil ► Paakal, Paharkai.

Action ► Seed/fruit—improves diabetic condition. Fruit—stomachic, laxative, antibilious, emetic, anthelmintic. Used in cough, respiratory diseases, intestinal worms, skin diseases, also for gout and rheumatism. Powdered fruit—applied to wounds and ulcers. Leaf—emetic, antibilious, purgative. Fruit, leaf and root—abortifacient. Leaf and seed—anthelmintic. Root—astringent; appled to haemorrhoids.

Immature fruits gave several non-bitter and bitter momordicosides. Fruits, seeds and tissue culture gave a polypeptide containing amino acids. Fruits also gave 5-hydroxytryptamine, charantin (a steroidal glucoside), diosgenin, cholesterol, lanosterol and beta-sitosterol. Bitter principles are cucurbitacin glycosides.

Hypoglycaemic effects of the fruit have been demonstrated by blood tests in both humans and animal studies.

Researchers have warned that the fruit extract leads to a false negative test for sugar in the urine (due to its ability to maintain the indicator dye in the glucose oxidase strips and the alkaline copper salts in a reduced state).

Chronic administration of the fruit extract (1.75 g/day for 60 days) to dogs led to testicular lesions with mass atrophy of the spermatogenic elements. The extract reduced the testicular content of RNA, protein and sialic acid as also the acid-phosphatase activity. (*Medicinal Plants of India,* Vol. 2, 1987, Indian Council of Medical Research, New Delhi.)

The fruits and seeds yielded a polypeptide, *p*-insulin, which was considered similar to bovine insulin. (*Fitoterapia,* 60, 1989; *Chem Abstr* 112, 1990.)

The seed and fruit contain an inhibitor of HIV, MAP-30 (Momordica anti-HIV-protein) which exhibited antiviral and antitumour activity *in vitro*. (*Chem Abstr,* 113, 1990; *ibid,* 117, 1992.) Another protein, MRK-29, found in the seed and fruit of a smaller var. of Bitter Gourd found in Thailand, was found to inhibit HIV reverse transcriptase and to increase tumour necrosis factor (TNF). (*Planta Med,* 67, 2001; *Natural Medicines Comprehensive Database,* 2007.)

The seeds yield alpha-and beta-momorcharins (glycoproteins). When these glycoproteins were co-cultured with isolated hepatocytes, morphological changes in hepatocytes were observed, indicating hepatotoxicity. Another principle with antilipolytic and lipogenic activities, found along with the alpha-and beta-momorcharin in the seed extract, did not show toxic effect.

Vicine is the hypoglycaemic constituent in the seed. Pure vicine has been found to possess 32.6% hypoglycaemic activity as against 22.2% shown by fresh juice, when tested on albino rats. The vicine is non-haemolytic.

Dosage ► Fresh fruit—10–15 ml juice (*API,* Vol. II); 10–20 ml juice (*CCRAS.*)

M

Momordica cochinchinensis Spreng.

Family ► *Cucurbitaceae.*

Habitat ► Cultivated throughout the country, especially found in Assam, Bengal, South India and Andaman Islands.

Ayurvedic ► Karkataka, Kaaravella-jalaja.

Folk ► Kakrol (Maharashtra), Bhat-karelaa, Gulkakraa.

Action ► Leaf and fruit—used externally for lumbago, ulceration, fracture of bone. Seed—bechic, aperient, emmenagogue, anti-inflammatory, deobstruent. (Used for obstructions of liver and spleen).

M

The tuberous root contains saponins belonging to the pentacyclic triterpene glycoside series. Seeds contain momordica saponins I and II (ester glycosides of gypsogenin and quillaic acid respectively), the diterpenoid columbin, oleanolic acid, its derivative momordic acid and bessisterol.

The seeds contain the glycoprotein, momorcochin S, which exhibits RNA N-glycosidase activity.

Momordica dioica Roxb. ex Willd.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India, up to 1,500 m in the Himalaya.

English ► Small Bitter Gourd, Bur Cucumber.

Ayurvedic ► Karkotikaa, Karkotikaa-vandhyaa, Karkotaka, Karkota.

Siddha/Tamil ► Tholoo-pavai, Paluppakai, Kaattupaagala.

Folk ► Jangali Karelaa, Ban-Karelaa, Bhat-Karelaa, Dhar-Karelaa.

Action ► Tuberous root—astringent, febrifuge, antiseptic, anthelmintic, spermicidal. Used in bleeding piles, urinary affections; smeared over body in high fever with delirium (as a sedative). A paste, prepared with the root of male plant, is applied externally for pain in the breast.

The root extract exhibited significant anti-allergic activity comparable with standard drugs used against allergy and bronchial asthma (in experimental animals).

Momordica tuberosa (Roxb.) Cogn.

Synonym ► *M. cymbalaria* Fenzl ex Naud.

Family ► *Cucurbitaceae.*

Habitat ► Maharashtra and Tamil Nadu, in bushes along the banks of water courses. (It is not cultivated.)

Ayurvedic ► Kaarali-Kanda, Kuduhunchi.

Siddha/Tamil ► Athalaikai

Folk ► Kakrol (Maharashtra).

Action ► Tuberous root—emmenagogue, abortifacient; acrid; contains a bitter glycoside.

Monochoria vaginalis Presl.

Family ► *Pontederiaceae.*

Habitat ► Throughout India in ponds, tanks, ditches, as a weed common in rice fields.

Ayurvedic ► Indivara (Kerala). Kakapola (Malyalam), Nirkancha (Telugu).

Siddha/Tamil ► Senkzhuneer-kizhangu.

Folk ► Nukha, Nanda (Bengal).

Action ► Leaves—juice is given for coughs. Roots—prescribed for stomach and liver complaints.

Bark—prescribed with sugar for asthma.

Monotropa uniflora Linn.

Family ► *Monotropaceae.*

Habitat ► The temperate Himalayas from Himachal Pradesh to Bhutan and in Khasi Hills at 1,800–2,400 m.

English ► Indian Pipe.

Action ► Root—sedative, nervine, antispasmodic.

The plant gave sitosterol, campesterol and traces of cholesterol. The oil contained linolenic, palmitic, linoleic and hexadecenoic acids.

Morinda citrifolia Linn.

Synonym ► *M. bracteata* Roxb.

Family ► *Rubiaceae.*

Habitat ► Sub-Himalayan tracts, Darjeeling, Konkan and the Andamans.

English ► Indian Mulberry.

Ayurvedic ► Ashyuka, Akshi, Atchy.

Siddha/Tamil ► Nunaa, Togaru.

Action ► Fruit—emmenagogue, antileucorrhoeic, antidysenteric, anticatarrhal (used in throat infections and asthma). Root and leaf—cathartic, febrifuge, anti-inflammatory (used in gout). Root—anticongestive, hypotensive. A decoction is given to regulate menstruation.

The heartwood yielded anthraquinones—alizarin and its glycosides, *nor*-damnacanthol. Leaves contain ursolic acid and beta-sitosterol. Fruits gave asperuloside and caproic acid.

The lyophilized aqueous extract of roots was evaluated for analgesic and behavioural effects in mice; positive results were observed confirming a sedative property without exhibiting any toxic effects.

Ethanolic extract of the plant showed significant antimicrobial activity.

Morinda coreia Buch.-Ham., *M. tinctoria* Roxb. (dry forests throughout the greater part of India) is considered as the wild form or a varient of *Morinda citrifolia* and is known by the same vernacular nemes. The root bark gave the insecticidal glycoside, morindin-6-primeveroside, which was found lethal on cockroaches and houseflies topically.

Morinda umbellata L. (Bihar, Khasi Hills and Peninsular India) is also known as Nunaa in Tamil Nadu.

A decoction of root and leaves is used for diarrhoea and dysentery. The root bark contains a considerable amount of rubichloric acid and small quantities of anthraquinones.

M

Moringa concanensis Nimmo ex Gibs.

Family ► *Moringaceae.*

Habitat ► Rajasthan and Peninsular India.

Ayurvedic ► Shigru (Red var.).

Siddha/Tamil ► Kaatumurungai.

Action ► See *M. pterygosperma.*

Moringa pterygosperma Gaertn.

Synonym ► *M. oleifera* Lam.

Family ► *Moringaceae.*

English ► Drumstick, Horse-Radish.

M

Ayurvedic ► Shigru (white var.), Madhu Shigru, Sigra, Shobhaanjana, Haritashaaka. Raktaka, Murangi, Mochaka, Akshiva, Tikshnagandhaa.

Unani ► Sahajan.

Siddha/Tamil ► Murungai.

Action ► All parts of the tree are reported to be used as cardiac and circulatory stimulant. Pods—antipyretic, anthelmintic; fried pods are used by diabetics. Flowers—cholagogue, stimulant, diuretic. Root juice—cardiac tonic, antiepileptic. Used for nervous debility, asthma, enlarged liver and spleen, deep-seated inflammation and as diuretic in calculus affection. Decoction is used as a gargle in hoarseness and sore throat. Root and fruit—antiparalytic. Leaf—juice is used in hiccough (emetic in high doses); cooked leaves are given in influenza and catarrhal affections. Root-bark—antiviral, anti-inflammatory, analgesic. Bark—antifungal, antibacterial. Stem-bark and flower—hypoglycaemic. Seeds—an infusion, anti-inflammatory, antispasmodic and diuretic; given in venereal diseases.

Along with other therapeutic applications, *The Ayurvedic Pharmacopoeia of India* indicated the use of the dried root bark in goitre, glycosuria and lipid disorders (also dried seeds), and leaf, seed, root bark and stem bark in internal abscess, piles and fistula-in-ano.

The plant contains antibacterial principles, spirochin and pterygospermin which are effective against both Gram-Positive and Gram-Negative bacteria.

The leaves contain nitrile glycosides, niazirin and niazirinin and mustard oil glycosides. The mustard oil glycosides showed hypotensive, bradycardiac effects and spasmolytic activity, justifying the use of leaves for gastrointestinal motility disorders.

The roots possess antibacterial, anticholeric and antiviral properties due to the presence of pterygospermin, Spiro chin and benzylisothiocyanate. The root extract exhibited significant anti-inflammatory activity in carrageenan-induced paw-oedema in rats.

The leaves exhibited hypoglycaemic activity, although the plasma insulin level did not alter much.

The root and bark showed antifertility activity through biphasic action on the duration of the estrous cycle of female rats.

Dosage ► Leaf—10–20 ml. juice. (*API,* Vol. III); root bark—2–5 g powder; stem bark—2–5 g powder; seed—5–10 g powder (*API,* Vol. IV). Leaf, flower, fruit, seed, bark, root—1–3 g powder; 50–100 ml decoction. (*CCRAS.*)

Morus alba Linn.

Family ► *Moraceae.*

Habitat ► Native to China; cultivated in Punjab, Uttar Pradesh, Kashmir and North-Western Himalayas.

English ► Chinese White-Mulberry.

Unani ► Shahtuut, Tuut.

Action ► Fruit—cooling, mild laxative. Used for sore throat, dyspepsia and melancholia. Leaves and root bark—expectorant, diuretic, hypotensive. Bark extract—hypoglycaemic. Leaf—anti-inflammatory, emollient, diaphoretic. Used as a gargle in inflammations of the throat.

The plant is rich in phenolics.

The leaves gave flavonoids (including rutin, moracetin); anthocyanins (cyanidin and delphinidin glucosides); artocarpin, cycloartocarpin and analogues. The root bark contained flavonoids including the kuwanons, sangennons, mulberrosides and mulberrofurans.

Hot water extract of the dried mulberry leaves fed to rabbits on 1% cholesterol diet exhibited significant hypolipidaemic or hypocholesterolaemic effect. In addition, suppression of hepatic enlargement and fat deposition in the hepatic cells was also observed.

An aqueous methanol extract of the root bark significantly reduced plasma sugar levels in mice.

The extract also showed anti-inflammatory and antipyretic activity in exudative, proliferative and chronic phases of inflammation.

Aqueous and alkali extracts of leaves and stems are active against Gram-Positive bacteria and yeast.

Morus nigra Linn.

Family ► *Moraceae.*

Habitat ► Native to West Asia; cultivated in Kashmir, also grown in Darjeeling.

English ► Black Mulberry.

Unani ► Tuut Siyaah.

Action ► Berries and root bark—mild laxative and used in the treatment of respiratory catarrh. Berries—refrigerant, given during convalescence.

The fruit contains invert sugar, pectin, fruit acids (including malic and citric acid), ascorbic acid, and flavonoids (including rutin). Leaves contain flavonoids, including rutin (2–6%). Root bark contains calcium malate; the bark of branches contains tannins, phlobaphenes, a sugar, a phytosterol, ceryl alcohol, fatty acids and phosphoric acid.

An infusion of leaves causes a drop in blood sugar, sometimes diuresis and a reduction in arterial pressure. It shows no effect on glucosuria.

Morus acidosa Griff., *M. australis* Poir and *Morus indica* L. have also been

equated with Tuut Siyaah of Unani medicine.

Mucuna monosperma DC.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Nepal, Khasi Hills, Deccan Peninsula and the Andamans.

Ayurvedic ► Kaakaandolaa.

Siddha/Tamil ► Periyattalargai.

Folk ► Kaagadolia (Gujarat).

Action ► Seeds—sedative, restorative, expectorant; used in coughs, asthma.

Mucuna prurita Hook.

Synonym ► M. pruriens Baker non DC.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughotu India, including Andaman and Nicobar Islands.

English ► Cowhage, Horse-eye Bean.

Ayurvedic ► Aatmaguptaa, Kapikacchuu, Rshabhi, Adhigandhaa, Ajadaaa, Kacchuraa, Laanguli, Rshyaproktaa, Svaguptaa, Shyaamguptaa, Markati, Kanduraa, Kevaanch, Shuukashimbi.

Unani ► Konchh.

Siddha/Tamil ► Poonaikkaali.

Action ► Seed—astringent, nervine tonic, local stimulant, used in impotence, spermatorrhoea, urinary troubles, leucorrhoea, traditionally used for male virility. Also used in depressive neurosis. Hair on fruit—vermifuge, mild vesicant; used for diseases of liver and gallbladder. Leaf—applied to ulcers. Pod—anthelmintic. Root and fruit—spasmolytic, hypoglycaemic. Root—CNS active.

The Ayurvedic Pharmacopoeia of India recommends the seed in impotence and paralysis agitans; the root in vaginal laxity.

The seeds contain the alkaloids, mucunine, mucunadine, mucunadinine, prurieninine, pruriendine and nicotine, besides beta-sitosterol, gluthione, lecithin, vernolic and gallic acids. They contain a number of bioactive substances including tryptamine, alkylamines, steroids, flavonoids, coumarins and cardenolides. L-DOPA is present in the seed as well as in the stem, leaves and roots.

Major constituents of the hairs on the pod are amines such as 5-hydroxytryptamine (serotonin), and a proteolytic enzyme mucuanain. (Serotonin was present only in pods.)

Prurieninine slowed down heart rate, lowered blood pressure and stimulated intestinal peristalsis in experiments carried out on frogs. The spasmolysis of smooth muscles was caused by indole bases.

Seed diet produced hypoglycaemic effect in normal rats, however, such diet had insignificant effect on alloxan-treated rats.

There is some evidence that Cowhage might be useful for chlorpromazine-induced hyperprolactinemia in men. (*Natural Medicines Comprehensive Database,* 2007.) (Males with hy-

perprolactinemia frequently face impotency.) (Cured seeds are used in Indian medicine for male sexual dysfunction.)

Mucuna cochinchinensis Cheval.; synonym *M. nivea* (Roxb.) DC.; Stizolobium niveum Kuntze (cultivated in Bengal and Bihar for edible pods and seeds) is known as Lyon Bean (Khamach in Bengal). The pod yielded L-DOPA (0.06%).

Dosage ► Cured seed—3–6 g (*API,* Vol. III); root—3–6 g powder for decoction (*API,* Vol. IV.)

Murdannia nudiflora (L.) Brenan.

Synonym ► Aneilema nudiflorum (L.) Wall.

Family ► *Commelinaceae.*

Habitat ► Throughout India, in moist and marshy places; common in West Bengal.

Ayurvedic ► Koshapushpi.

Folk ► Kanshura.

Action ► Plant—used in burns, boils and sores.

Murdannia scapiflora (Roxb.) Royle.

Synonym ► *Anilema scapiflorum* Wt. *A. tuberosum* Buch.-Ham.

Family ► *Commelinaceae.*

Habitat ► Temperate and tropical Himalaya, upper Gangetic plains and Peninsular India.

Folk ► Siyaah Musli; Sismulia (Gujarat); Kureli.

Action ► Root—astringent, febrifuge; used in headache, giddiness, jaundice. Root bark—diuretic, antispasmodic, (used in asthma, colic, infantile convulsions.)

Murraya exotica Linn.

Synonym ► *M. paniculata* (Linn.) Jack.

Family ► *Rutaceae.*

Habitat ► Throughout India and Andaman Islands up to an altitude of 1,500 m.

Siddha/Tamil ► Konji.

Folk ► Kaamini; Aanthil (Bihar).

Action ► Leaves—astringent; used in diarrhoea and dysentery (sap, squeezed from leaves, is administered). Root—antipyretic.

The plant is rich in coumarins, carbazole alkaloids and flavonoids. The leaves contain a number of coumarins, the major ones being murrangatin and phebalosin. Murrangatin, derived from the precursor phebalosin, is reported to possess antithyroid property. The root contains a *bis*-indole alkaloid, yuehchukene, with potent anti-implantation activity.

Mexolide (dimeric coumarin), isolated from the stem bark is antibacterial. The steam distillate of leaves exhibit antifungal and antibacterial activity.

Murraya koenigii (Linn.) Spreng.

Family ► *Rutaceae.*

Habitat ► Cultivated in Tamil Nadu; Maharashtra and North India.

English ► Curry-Leaf tree.

Ayurvedic ► Surabhini-nimba.

Unani ► Karipattaa.

Siddha/Tamil ► Karuveppilei, Karivempu, Kattuveppilei.

Folk ► Mithaa Neem, Kathneem, Gandhela, Barsanga.

Action ► Leaf—stomachic, antiprotozoal, spasmolytic; promotes appetite and digestion, destroys pathogenic organism, antidysenteric. Externally, used against skin eruptions.

All parts of the plant, especially the leaves, are rich in carbazole alkaloids (several carbazole bases have been isolated). The leaves also gave a coumarin glucoside, scopolin.

The beta-carotene content of curry leaves was found decreased on cooking; deep frying resulted in maximum loss.

Inclusion of curry leaves in the diet of diabetic patients reduced the blood glucose level appreciably (it did not produce any insulin response).

The steam distillate of the leaves is reported to exhibit antifungal and insecticidal activities.

The ethanolic extract of the stem bark showed anti-inflammatory effect in carrageenan-induced inflammation in rats.

Musa paradisiaca Linn.

Synonym ► *M. Sapientum* Linn.

Family ► *Musaceae.*

Habitat ► Assam, Madhya Pradesh, Bihar, Gujarat, Andhra Pradesh, Karnataka, Jalgaon district (Maharashtra), West Bengal, Tamil Nadu and Kerala.

English ► Banana, Plantain.

Ayurvedic ► Kadali, Rambhaa, Sakrtphala, Vaaranaa, Mochaa, Ambusaara, Anshumatiphal.

Unani ► Kelaa, Mouz.

Siddha/Tamil ► Vaazhai.

Action ► Fruit—mild laxative, combats diarrhoea and dysentery, promotes healing of intestinal lesions in ulcerative colitis. Unripe fruit considered useful in diabetes. Fruit powder—used as a food supplement in sprue and other intestinal disorders. Root—anthelmintic.

The Ayurvedic Pharmacopoeia of India recommends the fresh rhizome in dysuria, polyuria (in females) and menstrual disorders; the flower in asthma, bleeding disorders, vaginal discharges and leucorrhoea.

The pulp of ripe fruit (50 g/rat per day) given daily with standard food pellets prevented increase in blood pressure in deoxycorticosterone-induced hypertension in rats. This was found partially related to increased serotonin levels triggered by the high carbohydrate and tryptophan content of the fruit.

Dietary fibre prepared from unripe banana exerted an antiatherogenic effect, keeping the levels of cholesterol in serum and aorta low, as also the level of LDL cholesterol in rats fed on cholesterol diet.

An anti-ulcerogenic acylsterylglycoside, sitoindoside IV, has been isolated from unripe banana.

A pectin containing hexoses (32.4%) and uronic acid (52.5%) has been isolated from the pith of the stem. The pectin was found to exhibit significant hypolipidaemic and hypoglycaemic activity in rats.

The flower extract exhibited hypoglycaemic activity in rabbits.

The pseudostem is reported to possess lithotriptic and antilithic properties. The extract reduced the precursor of oxalate formation, the liver glycolic acid content in hyperoxaluric rats.

The benzene extract of the root exhibited significant antibacterial and antifungal activity.

Dosage ▶ Dried flower—10–20 g. (*API,* Vol. IV.)

Mussaenda frondosa Linn.

Synonym ▶ *M. frondosa* var. *glabrata* Hook. f.
M. glabrata (Hook. f.) Hutch.

Family ▶ *Rubiaceae.*

Habitat ▶ Tropical Himalayas, Khasi Hills, Deccan Peninsula and the Andamans.

English ▶ White Lady, White Rag Plant.

Ayurvedic ▶ Shrivati.

Siddha/Tamil ▶ Vellai-yilai, Vellimadandai.

Folk ▶ Shrivara, Bedina, Bebina, Bhutakesha (Maharashtra), Naagaballi (Bengal)

Action ▶ Flower—diuretic, antiasthmatic, antiperiodic. Leaves and flowers—used in external applications for ulcers. Root—used in the treatment of white leprosy. White petiolate bract—prescribed in jaundice.

The flowers contain anthocyanins, hyperin, quercetin, rutin, ferulic and sinapic acids; beta-sitosterol glucoside.

Mussaenda glabra Vahl (tropical Himalayas from Nepal eastwards, Bihar, Bengal and Assam) is known as Sonaaruupaa in Assam. An infusion of the leaves is used for cough, asthma, recurrent fevers; also as a diuretic in dropsy.

Mycrotomia benthami C. B. Cl.

Family ▶ *Boraginaceae.*

Habitat ▶ Garhwal, Tibet.

Folk ▶ Dimok (Tibet), Ratanjot (Garhwal).

Action ▶ Topically antiseptic.

National Formulary of Unani Medicine has equated *Onosma echioides* Linn. (*Boraginaceae*) with Ratanjot. *Geranium wallichianum* D. Don. (*Geraniaceae*); *Clausena pentaphylla* DC. (*Rutaceae*); and *Anemone obtusiloba* D. Don. (*Ranunculaceae*) are also known as Ratanjot.

Ratanjot should be equated with the root of *Alkanna tinctoria* (*Boraginaceae*), known as Dyer's or Spanish Bugloss.

Myrica nagi Hook. f. non-Thunb.

Synonym ► *M. esculenta* Buch.-Ham ex Don.

Family ► *Myricaceae.*

Habitat ► Subtropical Himalayas from the Ravi eastwards at 900–2,100 m.

English ► Box Myrtle.

Ayurvedic ► Katphala, Kushbhikaa, Shriparnikaa, Mahaavalkal, Bhadraa, Bhadravati.

Unani ► Kaayaphal.

Siddha/Tamil ► Marudam.

Action ► Bark—carminative, antiseptic. Used in fever, cough and asthma; also as a snuff in catarrh with headache. Fruit wax—used externally for ulcers. Fruit—pectoral, sedative.

The Ayurvedic Pharmacopoeia of India recommends the stem bark and fruit in anaemia and polyuria.

The stem bark gave myricanol, a proanthocyanidin. The root bark yielded beta-sitosterol, taraxerol and myricadiol. The stem bark exhibited analgesic, spasmolytic, hypotensive and antiarrhythmic activity.

Dosage ► Fruit—3–5 g, stem bark—3–5 g. (*API,* Vol. III.)

Myristica fragrans Houtt.

Family ► *Myristicaceae.*

Habitat ► Native to the Moluccas Islands; grown in the Nilgiris, Kerala, Karnataka and West Bengal.

English ► Nutmeg, Mace.

Ayurvedic ► Jaatiphala, Jaatishasya, Maalatiphala (seed kernel).

Jaatipatri, Jaatipatra, Jaatipatraka, Jaatikosha (mace).

Unani ► Jauzbuwaa (seed), Bisbaasaa (mace).

Siddha/Tamil ► Jaathikkai, Saadikai (nutmeg); Saadippatthiri, Jaadippatiri (mace).

Action ► Nutmeg—carminative, spasmolytic, antiemetic, orexigenic; topically anti-inflammatory. Mace—stimulant carminative. Narcotic in high doses.

Nutmeg is used in flatulency, diarrhoea, nausea and vomiting. Mace is used in rheumatism, chronic bowel complaints and asthma. When roasted, both nutmeg and mace are used for diarrhoea, colic, flatulence and dyspepsia.

Key application ► Dried seed and aril—included among unapproved herbs by *German Commission E.* Following actions have been considered: antispasmodic, MAO inhibition, inhibition of prostaglandin synthesis.

The Ayurvedic Pharmacopoeia of India recommends the kernel of the fruit in spermatorrhoea.

An aqueous extract of nutmeg is reported to show anti-secretory activity against E. coli heat-labile enterotoxin; the hexane soluble fraction of the alcoholic extract inhibited the heat-labile and heat-stable-enterotoxin-induced secretory response in animal studies.

The hexane extract contains myristicin, an anti-inflammatory principle, and licarin-B and dehydro diisoeugenol which exhibited CNS depressant properties. The extracts of nutmeg decreased kidney prostaglandin levels in rats. They also inhibited platelet aggregation (due to eugenol and isoeugenol). The anti-inflammatory activity observed in carrageenan-induced oedema in rats and enhanced vascular permeability in mice, are attributed to myristicin present in mace.

Mace also activates hepatic detoxification process. Monomeric and dimeric phenyl propanoids (myristicin, dehydro diisoeugenol) from mace, on p.o. administration in mice, produced suppression of lipid peroxidation in liver.

Seeds contain about 0.24% myristicin, whereas volatile oil about 3.12%.

The resorcinols, malabaricones B and C, isolated from the seed coat (mace) exhibited strong antibacterial and antifungal activities. Neoplasm inhibitors, phenylpropyl derivatives, have been isolated from pulverized mace.

Dosage ► Endosperm of dried seed (kernel of fruit)—0.5–1.0 g powder. (*API,* Vol. I.)

Myristica malabarica Lam.

Family ► *Myristicaceae.*

Habitat ► Western Ghats, Kanara and Malabar.

English ► Malabar Nutmeg, False Nutmeg, Bombay Nutmeg, Bombay Mace.

Ayurvedic ► Paashikaa, Raamapatri, Ku-Jaavitri. Pashupaashi (Kerala).

Siddha/Tamil ► Pathiri, Kattu Jhadi.

Action ► Topically stimulant; applied to indolent ulcers.

The fruit rind yielded diarylnonanoids and a lignin, malabaricanol. Leaves gave beta-sitosterol, myristic acid and its triglyceride, trimyristin.

Fat and resin are the major constituents of the Bombay mace. The crude fat (Pundi oil) is used as an embrocation in rheumatism.

The bark yields a kino.

Ripe fruits form the source of Bombay Nutmeg and Bombay Mace, used as adulterant of *Myristica fragrans.*

Dosage ► Seed kernel—1.5 g powder; oil—1–3 drops. (*CCRAS.*)

M

Myroxylon balsamum Harms.

Synonym ► *M. toluiferum* H. B. & K.

Family ► *Leguminosae.*

Habitat ► Indigenous to Venezuela, Columbia and Peru;. grown in Lal Bagh Botanic Garden (Bangalore) and Kallar (Nilgiris).

English ► Tolu Balsam tree.

Action ► Balsam—antiseptic, stimulant and expectorant. Used as an ingredient in cough mixtures, also used as an inhalant in cases of obstinate catarrh.

Key application ► Externally for poorly healing wounds, for burns, decubitus ulcers, frost bite, ulcus cruris, bruises caused by prostheses,

haemorrhoids; as antibacterial, antiseptic and antiparasitic (especially for scabies). (*German Commission E.*)
Balsam contains cinnamic acid, benzoic acid and their esters.

Myroxylon pereirae Kolotzsch (Lal Bagh Botanic Garden, Bangalore), is the source of Peru Balsam. Used externally in the form of an ointment or tincture, as a parasiticide in scabies, ringworm and pediculosis and for bed sores and chilblains. It enters into suppositories used in hemorrhoids.

Myrsine africana Linn.

M

Family ► *Myrsinaceae.*

Habitat ► Outer Himalayas from Kashmir to Nepal and in Khasi Hills at 300–2,700 m.

Ayurvedic ► Vaayavidanga (substitute). (*Embelia ribes* is the authentic source of Vidanga.)

Folk ► Bebrang (Punjab), Kakhum, Shamshaad (according to Unani reference books, Shamshaad is obtained from a *Pinaceae* tree).

Action ► Fruit—anthelmintic (used for the expulsion of tape worms; also as a substitute for *Emblia ribes*); antispasmodic, purgative; used externally against ringworm and other skin affections. Aerial parts—antifertility, abortifacient. (According to Unani medicine, the fruits of Shamshaad show antifertility activity in females.)

Berries and seeds contain embelic acid and quercitol (1%). Embelin (3%) is present in the dried fruit. Seeds also contain embelin.

Seeds of *M. semiserrata* Wall. contain embelin (0.4%) and quercitol (0.8%).

Seeds of *M. capitellata* Wall. contain 1.6% embelin.

These related species are found in Nepal, Bhutan, Assam and North Bengal.

Myrtus communis Linn.

Family ► *Myrtaceae.*

Habitat ► Cultivated in gardens of Northwestern India and Tamil Nadu.

English ► Myrtle, Clove Myrtle, Spanish Myrtle.

Unani ► Habb-ul-Aas, Muurad, Muurad-daan.

Folk ► Vilaayati Mehndi. Sutrasowa (Bengal). Kulinaval (Tamil Nadu).

Action ► Leaves—antiseptic, antimicrobial, antiparasitic. Used for acute and chronic respiratory tract infections, bladder conditions, urinary infections, and worm infestation.

Key application ► As a cough remedy. (*German Commission E.*)

The leaves contain tannins (pyrogallol derivative), flavonoids (including myricetin, about 90%, with kaempferol and quercetin glycosides; volatile oil containing alpha-pinene, cineole, myrtenol, nerol, geraniol and dipentene.

Myrtol, a fraction of myrtenol, is absorbed in the intestines, stimulates the mucous membrance of the stomach and deodorizes the breath.

Berry exhibits anti-inflammatory activity. The aqueous and ethanolic extracts of the leaves and branches exhibit hypoglycaemic activity in rats.

The essential oil and myrtucommulone B, isolated from the plant, are antibacterial and antitubercular. (Clove myrtle is used in Homoeopathy for treating lung complication of pleurodynia and dry hollow cough.)

Myxopyrum serratulum A. W. Hill.

Family ► *Oleaceae*.

Habitat ► Western Ghats.

Folk ► Chathuravalli, Chathuramulla (Kerala). Hem-maalati.

Action ► Leaves—used with clarified butter in cough, asthma, chest diseases; also in nervous complaints and rheumatism. Oil extract of the leaves is used for massage in fever, headache and backaches.

N

Naravelia zeylanica (Linn.) DC.

Family ► *Ranunculaceae.*

Habitat ► The tropical forests of eastern Himalayas, Assam, Bengal, Bihar, Deccan Peninsula.

Ayurvedic ► Dhanavalli (Kerala), Chhagul-bati (Bengal).

Siddha/Tamil ► Vathomkolli, Neendavalli.

Action ► Astringent, anti-inflammatory, vulnerary, anthelmintic. Used for colic, headache, inflammations, rheumatic pain, wounds and ulcers, intestinal worms, leprosy and skin diseases. Saps of stem—effective in onychia.

Narcissus tazetta Linn.

Family ► *Amaryllidaceae.*

Habitat ► All over Europe. Grown in Indian gardens.

English ► Narcissus, Daffodil, Lent Lily.

Unani ► Nargis.

Action ► Bulbs—powerfully emetic, diuretic, purgative. Poisonous. Oil is applied for curing baldness.

The bulbs are imported into India. Dried and sliced bulbs are sold as a substitute for bitter hermodactyls.

Alkaloids, lycorine, pseudolycorine, galanthamine, haemanthamine and narcisine, have been isolated from the bulbs of the species. The alkaloid narcisine is toxic.

The mucilage, narcissus T-glucomannan, isolated from the bulbs, was found to exhibit significant hypoglycaemic activity in mice.

Nardostachys jatamansi DC.

Synonym ► *N. grandiflora* DC.

Family ► *Valerianaceae.*

Habitat ► Alpine Himalayas, Kumaon, Sikkim and Bhutan.

English ► Spikenard, Musk-root.

Ayurvedic ► Maansi, Jataamaansi, Bhuutajataa, Tapaswini, Sulomashaa, Jatilaa, Naladaa.

Unani ► Sumbul-e-Hindi, Sambul-ut-Teeb, Naardeen-e-Hindi, Baalchhar.

Siddha/Tamil ► Sadamanchil.

Action ► Used as a substitute for Valerian. Tranquilizer, sedative, hypotensive. Used for the treatment of epilepsy, hysteria, convulsive affections, palpitation of heart and in intestinal colic. A decoction of powdered roots is prescribed as a home remedy for high blood pressure. It is used in dysmenorrhoea for pain relief and smooth menstrual flow. It is used in hair oil for arresting hair loss and greying of hair.

The Ayurvedic Pharmacopoeia of India recommends dry rhizomes in obstinate skin diseases, erysipelas, disturbed mental state and insomnia.

The rhizome is rich in sesquiterpenoids. The crude drug gave an oil (yield 2.5% v/w), which contains *d*-nardostachone, valeranone and jatamansone as the major ketonic sesquiterpenes. The oil potentiated phenobarbital narcosis in rats, reduced brain serotonin content and decreased the conditioned avoidance performance in cats.

Jatamansone was shown to exert tranquilizing effect in mice and monkeys. In rabbits, jatamansone was found to impair biosynthesis of serotonin in the brain leading to a reduction in brain level of 5-hydroxytryptamine. The degradation of serotonin was unaffected. The mode of action of jatamansone was thus in variance with that of reserpine which has direct action on the cell to liberate serotonin.

On the other hand, the alcoholic extract of the roots of Indian Nard caused an overall increase in the levels of central monamines, 5-hydroxy indole acetic acid and the inhibitory amino acids, gamma-aminobutyric acid, norepinephrine, dopamine and serotonin in rat brain.

In a clinical trial on hyperkinetic children, jatamansone showed significant reduction in hyperactivity and improvement in restlessness and aggressiveness, almost at par with D-amphetamine.

The volatile oil was found to be less active than quinidine in several tests. It did not counteract digitalis induced ventricular arrhythmias.

Jatamansone semicarbazone, a sesquiterpene ketone, was found to possess antiestrogenic activity.

N. jatamansi is also used in place of Muraa (*Selinum tenuifolium* Wall. ex DC.)

Dosage ► Root—2–3 g powder; 5–10 g for infusion; 50–100 ml infusion. (*API*, Vol. I; *CCRAS.*)

Naregamia alata Wight & Arn.

Family ► *Meliaceae.*

Habitat ► Western Ghats of Tamil Nadu and Karnataka, up to 1,000 m.

English ► Goanese Ipecacuanha.

Folk ► Nilanaaringa, Bhumi-Naagaranga. Pitta-vela, Tinpaani (Maharashtra).

Action ► Root—emetic, cholagogue, expectorant, antidysenteric; plant—antirheumatic; leaf and stem—antibilious.

Creeping roots possess properties similar to ipecacuanha (*Cephaelis ipecacuanha*).

The plant is used in prescriptions for malarial and chronic fevers, anaemia and enlarged spleen.

The root and stem gave heneicosane, beta-sitosterol, stearic and palmitic acids.

Nasturtium officinale R. Br.

Synonym ► *Rorippa nasturtium-aquaticum* (Linn.) Hayek.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Cultivated in Bengal, Orissa and Punjab.

English ► Watercress.

Folk ► Piriyaa-Haalim (Punjab), Latputiyaa (Maharashtra).

Action ► Leaves—antiscorbutic, expectorant (used in catarrh of the respiratory organs), diuretic (used in kidney and bladder disorders), detoxifying. A lotion of leaves is applied to blotches, spots and blemishes. Fresh herb is used as a blood purifier.

Key application ► For catarrh of respiratory tract. (*German Commission E.*)

Watercress contains vitamin A 4720 IU, ascorbic acid 77 mg/100 g, also thiamine, riboflavin, niacin and biotin; mineral matter 2.2%—calcium 290, phosphorus 140, iron 4.6 mg/100 g, also sulphur, iodine, manganese, zinc, arsenic and copper; proteins 2.9%, amino acid composition includes leucine, phenylalanine, valine, lysine, tyrosine, alanine, threonine, glutamic acid, serine, aspartic acid, cystine, methionine sulphoxide and proline.

The glucosinolate phenethyl isothiocyanate, which is released upon chewing the leaf, is a chemopreventive agent against lung cancer. (cited in *Expanded Commission E Monographs.*)

Watercress is contraindicated in gastric and duodenal ulcers and inflammatory kidney diseases. (Francis Brinker.)

Nelumbo nucifera Gaertn.

Synonym ► *Nelumbium speciosum* Willd.

Family ► *Nymphaeaceae.*

Habitat ► Throughout warmer parts of India, up to 1,800 m.

English ► East Indian Lotus, Sacred Lotus.

Ayurvedic ► Kamala, Padma, Nalina, Aravinda, Jalaja, Raajeeva, Pushkara, Ambuja, Abja, Pankaja. Pundarika (whitish), kokanada (red), Indivara (Bluish).

Unani ► Used as a substitute for Nilofar.

Siddha/Tamil ► Thaamarai, Ambel.

Action ► Filament—astringent and haemostatic. Prescribed for bleeding piles and menorrhagia. Flowers—a decoction is given in cholera, fever, strangury, palpitation of heart. Rhizomes—given in piles, chronic dyspepsia and dysentery; applied externally to cutaneous eruptions, scabies and ringworm. Rhizome-arrowroot—given to children in diarrhoea and dysentery. Root—astringent, diuretic, antiemetic, cooling. Used for dysentery, dyspepsia, piles, skin affections and for its anticoagulant properties.

The Ayurvedic Pharmacopoeia of India recommends dried rhizomes, with roots attached at nodes, in syncope and vertigo.

Flowers yielded quercetin, luteolin and their glycosides and kaempferol

glycosides. Leaves gave quercetin, isoquercitrin and leucoanthocyanidin.

Isoquinoline alkaloid, nuciferin, is neuroleptic. Active agents in the leaves are the alkaloids, nelumbin and roemerin.

Dosage ► Dried flower—12–24 g for decoction (*API,* Vol. II); rhizomes—5–10 m powder; 10–20 ml juice (*API,* Vol. III). Seed—3–6 g powder; flower—10–20 ml juice. (*CCRAS.*)

Nepeta cataria Linn.

Family ► *Labiatae, Lamiaceae.*

Habitat ► Cultivated in Britain and the USA. Occurs in Himalayas from Kashmir to Nepal at 2,000–3,300 m.

English ► Catnip, Catnep, Catmint.

Action ► Leaves and flowers—gentle nerve relaxant and sedative, carminative, antispasmodic, antidiarrhoeal, diaphoretic, febrifuge. Used in restlessness, convulsions, nervous headache, colic, early stages of fever, colds and influenza. The herb is to be infused (not boiled).

Catnip contains iridoids, tannins and volatile oil, major components being alpha- and beta-nepetalactone (up to 42%), citronellol and geraniol.

The catnip response in the domestic cat is being attributed to iridoid lactones, nepetalactone, dihydronepetalactone, iso-dihydronepetalactone and neonepetalactone. Its reputation as a hallucinogen has been disputed, but a few studies have shown behavioural effects, although weak, in young chicks, rodents and cats. (*Potter's New Cyclopaedia.*)

Neptalactone is structurally related to valepotriates found in valerian. (*Natural Medicines Comprehensive Database,* 2007.)

Nepeta hindostana (Roth) Haines.

Synonym ► *N. ruderalis* Buch-Ham. ex Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Punjab, Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh and South India up to 2,400 m. (Blue-flowered var.)

Unani ► Baadranjboyaa, Billilotan. Also equated with *Melissa officinalis.*

Action ► See *Nepeta cataria.*

The alcoholic extract of the plant yielded a triterpenoid aldehyde, nepehinal. Nepetidone, nepedinol, and a triterpenic acid have also been reported. The plant contains flavonoids including nepitrin, dinatin, nepetin. Flowers and stem gave napetol, hentriacontane and beta-sitosterol. An aqueous extract of flowers contained Na, K, Ca, Mg, Zn, Cd, Cu, Ni, Mn and Fe.

Alcoholic extract of the plant produced marked hypocholesterolaemic effect in experimental animals. It also produced beneficial effects in the histopathology of myocardial infarction. Aqueous extract of the plant, given intravenously, lowered the blood pressure in dogs by 26.87%. It also showed CNS depressant and sedative

activities. (In Indian medicine, the plant is used in various cardiac conditions including cardiac asthma.)

Neptunia oleracea Lour.

Synonym ► *N. prostrata* Baill.

Family ► *Mimosaceae.*

Habitat ► Throughout India, in tanks.

Ayurvedic ► Lajjaalu (var.), Alambushaa. (Provisional synonyms.)

Siddha ► Sadai, Sundaikkirai.

Folk ► Paani-lajak (Punjab).

Action ► Astringent, refrigerant.

Mimosa pudica Linn. is the accepted source of the classical herb Lajjaalu. It is used as astringent and styptic.

Nerium indicum Mill.

Synonym ► *N. odorum* Soland.

Family ► *Apocynaceae.*

Habitat ► Native of Mediterranean region; grown in Indian gardens.

English ► Indian oleander, White oleander.

Ayurvedic ► Karavira, Viraka, Ashvamaaraka, Hayamaaraka, Gauripushpa, Divyapushpa, Shatakumbha, Siddhapushpa (white-flowered var.). Raktapushpa, Raktaprasava, Ravipriya (red-flowered var.)

Unani ► Kaner Safed, Diflaa, Samm-ul-maar, Khar-zaharah.

Siddha/Tamil ► Arali, Alari, Aatrulari, Karaviram.

Action ► Root—resolvent and attenuant. A paste of the root is externally applied to haemorrhoids and ulcerations in leprosy. Paste of the root bark and leaves is used in ringworm and other skin diseases. An oil extracted from the root bark is used in skin diseases of scaly nature. Leaves—cardioactive (digitalis-like effect) and diuretic, anti-inflammatory, antifungal, insecticidal. Toxic.

The leaves contain several glycosides including glycosides of 8 beta-hydroxy-digitoxigenin. Cardenolide glycosides and pregnanolone glycosides have been isolated from roots.

The ethanolic extract of the flowers inhibits the growth of dermatophytes.

The plant shows antifungal activity against ringworm fungus, *Microsporum nanum.*

Dosage ► Detoxified leaves—30—125 mg powder (*API,* Vol. I); root—30 mg—125 mg powder (*API,* Vol. III).

Nerium oleander Linn.

Family ► *Apocynaceae.*

Habitat ► Native to Mediterranean region; grown in Indian gardens.

English ► Red Oleander, Rose Bay.

Unani ► Surkh Kaner.

Action ► See *N. indicum.*

(The white- and red-flowered varieties are equated with *Nerium oleander;* both possess similar properties. The yellow-flowered variety is equated with *Thevetia peruviana.*)

N

Key application ▶ Leaf—included among unapproved herbs by *German Commission E.* Positively inotropic and negatively chronotropic actions have been mentioned; the use of leaf for diseases and functional disorders of the heart, as well as for skin diseases has been indicated.

The leaves and roots gave a number of active principles including glycosides, terpenoids, sterols and other compounds. Cardiac steroids, isolated from the leaf, include oleandrin, gentiobiosyl oleandrin, odoroside. The stem contained alanine arginine, aspartic acid, cysteine, glutamic acid, glycine, histidine, leucine, isoleucine, lysine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine. A polysaccharide (2.3%), containing galacturonic acid, rhamnose, arabinose and galactose has been isolated from leaves.

Neutral fraction from leaves at low doses caused marked suppression of locomotor activity.

Aqueous extract of leaves showed significant antibacterial activity against *Pseudomonas aeruginosa.* The leaves also showed insecticidal activity.

N

Nervilia aragoana Gaudich.

Synonym ▶ *Pogonia flabelliformis* Lindl.

Family ▶ *Orchidaceae.*

Habitat ▶ Tropical Himalayas from Garhwal eastwards at altitudes of 1,200–1,500 m and in Bihar, Konkan, North Kanara and Travancore.

Ayurvedic ▶ Padmachaarini, Shankhaaluka. (Sthala Kamala is a doubtful synonym.)

Action ▶ Astringent, diuretic (used in dysuria).

A decoction of leaves is given after parturition.

Neuracanthus sphaerostachyus Dalz.

Family ▶ *Acanthaceae.*

Habitat ▶ Western Ghats, Deccan and Gujarat.

Folk ▶ Ganther (Gujarat and Maharashtra), Ghosa-vel (Maharashtra).

Action ▶ Root-paste applied to ringworm.

Nicotiana tabacum Linn.

Family ▶ *Solanaceae.*

Habitat ▶ Native to tropical America; cultivated mainly in Andhra Pradesh, Maharashtra, Karnataka, Uttar Pradesh, West Bengal.

English ▶ Tobacco.

Ayurvedic ▶ Taamraparna, Dhuumrapatraa.

Unani ▶ Tambaakhu.

Action ▶ Leaves—decoction is locally applied for muscle relaxation in dislocation, strangulated hernia and orchitis. Also for arthralgia, lumbago, rheumatism and gout (an ointment is made by simmering the leaves in lard). Not used internally as a medicine.

The plant contains nicotine as the major alkaloid.

Toxic influence of cigarette and *bidi* smoking on carboxyhaemoglobin levels of the blood of regular smokers was compared and no significant difference was observed in both of them. A pyrolysed tobacco product, used in India as a dentifrice, when administered to rats, showed activity comparable to benzo(a)pyrene, a potent carcinogen.

Habitual consumption of betel quid containing tobacco shows a strong cytotoxic potential.

Nicotiana rustica Linn. is known as Kalakatiyaa or Vfilaayati tobacco. Its nicotine content is high and is not suitable for cigarettes, cigars or *bidis*. Different variants of this tobacco are used for hookah, chewing and snuff.

Nigella damascena Linn.

Family ► *Ranunculaceae.*

Habitat ► Native to Southern Europe; cultivated in Indian gardens.

English ► Love-in-a-mist.

Ayurvedic ► Upakunchikaa (var.).

Siddha ► Karumcheerakam.

Action ► Seeds—carminative, emmenagogue, anthelmintic. A tincture prepared from the ripe seeds is used against catarrhal inflammations of liver and intestines in homoeopathy.

Nigella sativa Linn.

Family ► *Ranunculaceae.*

Habitat ► Cultivated in Punjab, Bengal, Assam and Bihar.

English ► Black Cumin, Small Fennel.

Ayurvedic ► Kaalaajaaji, Kalikaa, Prthvikaa, Sthulajiraka, Sushavi, Upkunchikaa (the plant bears seeds of bigger size).

Unani ► Kalonji, Kamaazaruus.

Siddha/Tamil ► Karum seeragm.

Action ► Seeds—stimulant, carminative, diuretic, lactiferous, emmenagogue (stimulate uterine contractions). Used in puerperal fever. Powdered seeds externally applied to boils. Essential oil—used in common cold, cough and bronchospasm.

The essential oil from seeds contains nigellone and 2-methyl-4-isopropyl-*p*-quinone. The oil contains carvone (45–60%), *d*-limonene and cymene. Seeds contain fatty acids including palmitic, myristic, stearic, oleic, linoleic and linolenic. Beta-sitosterol is also present in the seeds.

Low concentration of nigellone has been shown to inhibit the release of histamine from mast cells in animals. (*Natural Medicines Comprehensive Database,* 2007.)

The ethanolic extract of the seeds and the volatile oil from seeds showed antispasmodic activity in experimental animals, possibly due to a calcium antagonistic effect.

The oil exhibited CNS depressant and potent analgesic effects on experimental animals, possibly due to the presence of an opioid principle in the oil.

Dosage ► Seed—1–3 g powder (*API*, Vol. I); 3–5 g powder (*CCRAS*).

Nilgirianthus ciliatus (Nees) Bremek.

Synonym ► *Strobilanthes ciliatus* Nees.

Family ► *Acanthaceae.*

Habitat ► Western Ghats from South Kanara to Travancore, in evergreen forests.

Ayurvedic ► Sahachara (pale-rose-flowered var. used in Kerala). (Sahachara is equated with *Barleria prionitis* in other regions.)

Siddha/Tamil ► Kurinji, Sinnangur-inji.

Action ► Used against neurological disorders, sciatica, glandular swellings and oedema.

Nothosaerva brachiata Wight.

Family ► *Amaranthaceae.*

Habitat ► Distributed in tropical Africa and Asia; found throughout the plains of India.

Folk ► Dhaulaa-findauri (Rajasthan).

Action ► Used as a substitute for Paashaanabheda (*Aerva lanata* Juss. ex Schult., *Amaranthaceae*) for its diuretic and lithotriptic properties.

Notonia grandiflora DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Konkan, Western Ghats, Deccan and hills of South India.

English ► Common Fleshy Rag-weed.

Siddha/Tamil ► Mosakathu-thalai.

Folk ► Waandar-Roti, Gaidar (Maharashtra).

Action ► Plant—feebly aperient. Used externally for pimples.

Nyctanthes arbor-tristis Linn.

Family ► *Oleaceae; Nyctanthaceae.*

Habitat ► Outer Himalaya, Assam, West Bengal; cultivated in many parts of India.

English ► Tree of Sorrow, Night Jasmine, Coral Jasmine.

Ayurvedic ► Paarijaata, Shephaali, Shephaalikaa, Mandaara.

Unani ► Harasingaar.

Siddha ► Pavazha mattigai.

Action ► Leaves—bitter tonic, cholagogue, febrifuge, anti-inflammatory, antispasmodic, hypotensive, respiratory stimulant. Used for fevers, rheumatism, obstinate sciatica.

The leaves and seeds contain iridoid glycosides; other constituents reported from the leaves are mannitol, beta-amyrin, beta-sitosterol, hentriacontane, benzoic acid, astragalin, nicotiflorin, oleanolic acid, nyctanthic acid, friedelin and lupeol. The seeds contain a polysaccharide glucomannan.

All parts of the plant are used for allergic disorders. Alcoholic extract of the plant was found to inhibit passive

cutaneous anaphylaxis (PCA) in experimental animals. The inhibition was comparable to standard drugs used for allergy and bronchial asthma.

Ethanolic extract of the leaves, flowers and seeds demonstrated strong stimulation of antigen specific and non-specific immunity in mice.

The 50% ethanolic extracts of the leaves, flowers, seeds and roots were found effective in treating caecal amoebiasis caused by *Entamoeba histolytica* in rats. But the extracts did not exhibit direct amoebicidal activity *in vitro* against trophozoites of the parasite.

The iridoid glucosides showed antileishmanial activity both *in vivo* and *in vitro*.

Dosage ► Leaf—10–20 ml juice. (*CCRAS.*)

Nymphaea alba Linn.

Family ► *Nymphaeaceae.*

Habitat ► Kashmir (in lakes).

English ► European White Water-lily.

Ayurvedic ► Kumuda, Utpala (white-flowered var.) (Mahotpla is the synonym of *Nelumbo nucifera.*)

Unani ► Nilofar.

Siddha/Tamil ► Alli (water lilies).

Action ► Flowers and rhizomes—astringent, demulcent, mild sedative, spasmolytic, antiseptic, antimicrobial. Used in the form of an infusion internally for chronic diarrhoea, as a douche for leucorrhoea and vaginitis, as a gargle for sore throat. Also given internally in prostatis. Seeds—used in diabetes, also in cutaneous diseases. Filaments—astringent and cooling; prescribed for bleeding piles and menorrhagia. Plant—toxic on the nervous system.

The flowers contain flavonoids including quercetin, kaempferol, apigenin. Cardiac glucoside, nymphalin, showed sedative action in small doses.

The petroleum ether extract of the plant of *Nymphaea* species, given at a dose of 300 mg/kg *i.p.* prevented necrosis of the liver tissue and promoted, to some extent, liver regeneration in CCl4-induced toxicity.

Dosage ► Dried flowers—3–6 g (*API,* Vol. III); seed—3–6 g. powder (*CCRAS.*).

Nymphaea rubra Roxb. ex Salisb.

Synonym ► *N. nouchali* Burm. f.
N. lotus Hook. f. Thoms non L.

Family ► *Nymphaeaceae.*

Habitat ► Throughout the warmer parts of India.

English ► Indian Red Water-lily.

Ayurvedic ► Kumuda, utpala (red-flowered var.).

Siddha/Tamil ► Alli-tamarai, Vellambal.

Action ► Flower—astringent, cardiac tonic; used in palpitation of heart. Rhizomes—used for dysentery and dyspepsia.

See *N. alba.*

Nymphaea stellata Willd.

Family ► *Nymphaeaceae.*

Habitat ► A native to Southeast Asia; found in ponds and ditches throughout India.

English ► Indian Blue Water-lily.

Ayurvedic ► Nilotpala (blue or voilet-flowered var.).

Unani ► Nilofar.

Siddha/Tamil ► Neelothpalam.

Action ► See *N. alba.*

Nymphoides macrospermum Vasudevan.

Family ► *Menyanthaceae.*

Habitat ► South India.

Folk ► Granthik Tagar.

Action ► Sedative, antispasmodic. Used in neurological disorders and colic.

Stalks and leaves—pounded with oil and applied to ulcers.

See *Limnanthemum cristatum* Griseb.

O

Ochna jabotapita Linn.

Synonym ► *O. squarrosa* Linn.

Family ► *Ochnaceae.*

Habitat ► Assam, Bihar, Orissa and Deccan Peninsula. Often cultivated in parks and gardens.

Siddha/Tamil ► Chilanti, Sherundi.

Folk ► Kanaka Champaa. (Bhuin-champaa, Bhuumi-champaka (*Ochna pumila*).

Action ► Bark—digestive tonic. Root—a decoction is used in asthma, tuberculosis and in menstrual disorders. Leaves—boiled and used as emollient cataplasm; used as a poultice in lumbago.

Isoflavones, along with beta-sitosterol and oleanolic acid, have been isolated from the heartwood.

A related species, *Ochna pumila* Buch.-Ham. ex D. Don., found in outer Himalayas and sub-Himalayan tract from Kumaon to Assam, is reported to exhibit antitubercular activity. Tetrahydroamentoflavone has been isolated from the leaves. The plant is also used for epilepsy in folk medicine.

Ochrocarpus longifolius Bentb. & Hook. f.

Synonym ► *Mammea longifolia* Planch. & Triana.

Family ► *Guttiferae; Clusiaceae.*

Habitat ► Evergreen forests of Western India from Khandala southwards to Malabar and Coimbatore.

Ayurvedic ► Surapunnaaga (Naagakeshara is equated with *Mesua ferrea.*)

Siddha/Tamil ► Nagappu, Nagesarpu.

Folk ► Laal-Naagakeshar. Surangi (Maharashtra).

Action ► Flowerbuds—cooling, stomachic, analgesic, antibacterial; used for gastritis, haemorrhoids, blood diseases, leprosy, leucoderma.

Flower buds are popularly known as Naagakeshar.

Flowers exhibited potent hypotensive, anti-inflammatory and antispasmodic activity attributed to vitexin.

Leaves gave amentoflavone, quercetin and vitexin as major constituents.

Ocimum basilicum Linn.

Synonym ► *O. caryophyllatum* Roxb.
O. minimum Linn.
O. pilosum Willd.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Lower hills of Punjab; cultivated throughout India.

English ► Sweet Basil, Basil Herb.

Ayurvedic ► Barbari, Tuvari, Tungi, Kharpushpa, Ajgandhikaa, Baabui Tulasi.

Unani ► Faranjmishk. (also equated with *Dracocephalum moldavica* Linn. by *National Formulary of Unani Medicine.*), Raihan (also equated with *O. sanctum*). (used as a substitute for Phanijjaka.)

Siddha/Tamil ► Tiruneetruppachhilai.

Folk ► Bana-Tulasi. Sabzaa (Maharashtra).

Action ► Flower—stimulant, carminative, antispasmodic, diuretic, demulcent. Seed—antidysenteric. Juice of the plant—antibacterial. Essential oil—antibacterial, antifungal, insecticidal.

(Because of high estragole content of the essential oil, the herb should not be taken during pregnancy, nursing or over extended periods of time.) (*German Commission E.*) Included among unapproved herbs by *German Commission E.*

The herb contains an essential oil; major constituents are linalool (up to 55%) methyl ether (estragole) up to 70% and eugenol; caffeic acid derivatives; flavonoids. Thymol and xanthomicrol were isolated from the leaves. Aesculetin, *p*-coumaric acid, eriodictyol, its 7-glucoside and vicenin-2 from leaves have been isolated.

The essential oil at concentration of 0.15% completely inhibited mycelial growth of twenty two species of fungi, including mycotoxin-producing strains of *Aspergillus flavus* and *A. parasiticus.* Leaves act as an insect repellent externally; bring relief to insect bites and stings.

In homoeopathy, the fresh mature leaves are used to treat haematuria, inflammation and congestion of kidney.

Dosage ► Whole plant—50–100 ml decoction; seed—1–3 g powder. (*CCRAS.*)

Ocimum canum Sims.

Synonym ► *O. americanum* Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Plains and lower hills of India.

English ► Hoary Basil.

Ayurvedic ► Kaali Tulasi, Vana-Tulasi.

Siddha/Tamil ► Ganjamkorai, Nai-Tulasi.

Action ► Plant—stimulant, carminative, diaphoretic. Leaf—bechic, febrifuge; used in cold, bronchitis, catarrh, externally in skin diseases. Essential oil—antifungal. Seeds—hypoglycaemic; also used in the treatment of leucorrhoea and other diseases of urinogenital system.

The essential oil at the flowering stage contains citral as a major component along with methylheptenone, methylnonylketone and camphor.

Leaves yielded beta-sitosterol, betulinic acid and ursolic acid and flavonoids, pectolinarigenin-7-methylether and nevadensin.

Seeds exhibited antidiabetic activity, improved glucose tolerance was observed in diabetic patients who were

given 30 g seed/day for 1 month, lowering of fasting plasma glucose level up to 30% was also observed.

Ocimum gratissimum Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Throughout India.

English ► Shrubby Basil.

Ayurvedic ► Vriddha Tulasi, Raam-Tulasi, Raan-Tulasi.

Siddha ► Elumicha-Tulasi, Peria-Tulasi.

Action ► Plant—used in neurological and rheumatic affections, in seminal weakness and in aphthae of children. Seed—used in cephalalgia and neuralgia. Essential oil—antibacterial, antifungal.

In homoeopathy, fresh mature leaves are used in constipation, cough, fever, nasal catarrh; also in gonorrhoea with difficult urination.

A heterotic hybrid 'Clocimum' (polycross of *gratissimum*) has been developed in India which yields 4.5–5.7% essential oil having a eugenol content up to 95%. Direct production of methyl eugenol and eugenol acetate from 'Clocimum' oil is reported.

Major constituents reported from 'Clocimum' oil are myrcene 8.87, eugenol 68.14, isoeugenol 13.88, methyleugenol 1.74%; other constituents are alpha- pinene, limonene, phellandrene, terpene 4-ol, alpha-terpineol, carveol, carvene, geranyl acetate, caryophyllone and caryophyllone oxide.

(At Regional Research Laboratory, CSIR, Jammu, a study was conducted to assess the inheritance pattern of major chemical constituents of essential oils in hybrids produced by interspecific as well as intraspecific crosses of *Ocimum* sp.).

Ocimum kilimandscharicum Guerke.

Synonym ► *O. camphora* Guerke.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native of Kenya. Cultivated on a small scale in West Bengal, Assam, Tamil Nadu, Karnataka, Kerala and Dehr Dun.

English ► Camphor Basil.

Ayurvedic ► Karpura Tulasi.

Action ► Plant—spasmolytic, antibacterial. Decamphorized oil—insecticidal, mosquito repellent.

Essential oil contains camphor, pinene, limonene, terpinolene, myrcene, beta-phellandrene, linalool, camphene, *p*-cymene, borneol and alpha-selinene. The Camphor content varies in different samples from 61 to 80.5%.

Ocimum sanctum Linn.

Synonym ► *O. tenuiflorum* Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Throughout India; grown in houses, gardens and temples.

English ► Holy Basil, Sacred Basil.

Ayurvedic ► Tulasi, Surasaa, Surasa, Bhuutaghni, Suravalli, Sulabhaa, Manjarikaa, Bahumanjari, Deva-

dundubhi, Apet-raakshasi, Shuulaghni, Graamya, Sulabhaa.

Unani ► Tulasi.

Siddha/Tamil ► Tulasi, Nalla-Tulasi.

Action ► Leaf—carminative, stomachic, antispasmodic, antiasthmatic, antirheumatic, expectorant, stimulant, hepatoprotective, antiperiodic, antipyretic and diaphoretic. Seed—used in genitourinary diseases. Root—antimalarial. Plant—adaptogenic, antistress. Essential oil—antibacterial, antifungal.

The Ayurvedic Pharmacopoeia of India recommends the use of the leaf and seed in rhinitis and influenza; the seed in psychological disorders, including fear-psychosis and obsessions.

Major components of the essential oil are eugenol, carvacrol, nerol and eugenolmethylether. Leaves have been reported to contain ursolic acid, apigenin, luteolin, apigenin-7-O-glucuronide, luteolin-7-O-glucuronide, orientin and molludistin.

Ursolic acid, isolated from leaves, exhibited significant protection of mast cell membrane by preventing granulation and decreased histamine release. The ethanolic extract (50%) of fresh leaves, volatile oil from fresh leaves and fixed oil from seeds showed antiasthmatic activity and significantly protected guinea-pigs against histamine and dyspnoea. They also showed anti-inflammatory activity against carrageenan-, serotonin-, histamine- and PGE-2-induced inflammation and inhibited hind paw oedema in rats.

The ethanol extract (90%) of the leaves showed hepatoprotective effect against paracetamol-induced liver damage.

The plant extract exhibited antiulcerogenic property against experimental ulcers.

Oral administration of alcoholic extract of leaves lowers blood sugar level in normal, glucose-fed hyperglycaemic and streptozotocin-induced diabetic rats. The activity of the extract was 91.55 and 70.43% of that of tolbutamide in normal and diabetic rats respectively.

Administration of the juice of the plant affected a significant reduction in the size of urinary brushite crystals.

A study of methanol extract and aqueous suspension of the leaves showed immunostimulation of humoral immunologic response in albino rats indicating the adaptogenic action of the plant.

Dosage ► Seed—1–2 g powder (*API,* Vol. IV); plant—50–10 ml infusion (*CCRAS.*).

Ocimum viride Willd.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to Africa; introduced into India.

English ► Fever plant of Sierra Leone.

Folk ► Taap-maari Tulasi (Maharashtra).

Action ► Leaves—febrifugal. Used as a remedy for coughs and fevers. Oil—antiseptic.

Ocimum viride species, cultivated in Jammu-Tawi, gives maximum oil yield

(0.4%) at full bloom stage and highest percentage of thymol (55.12%) in the oil, which can be used as a substitute for thyme-ajowan oil.

Oenanthe javanica (Blume) DC.

Synonym ▶ *O. stolinifera* Wall. ex DC.

Family ▶ *Apiaceae; Umbelliferae.*

Habitat ▶ Marshy places and river banks in North India from Kashmir to Assam.

Folk ▶ Jateraa (Meghalaya); Panturasi (Bengal).

Action ▶ The plant extract showed strong antimutagenic and antitumour activity.

From the herb, beta-sitosteryl glucoside, stigmasteryl glucoside, isorhamnetin and hyperin were isolated. The fruit yield 1.5% of an essential oil, containing phellandrene and myristicin.

Oenothera odorata Jacq.

Family ▶ *Onagraceae.*

Habitat ▶ Native to Chile; cultivated as a garden plant in South Australia. Introduced into Indian gardens.

English ▶ Evening Primrose (var.); Sundrop (var.).

Action ▶ Oil from seeds—prescribed for eczema (in children); premenstrual syndrome and cyclical breast pain.

Linalool (70.0%) was determined in the flower oil.

Evening Primrose is equated with *Oenothera biennis* L. (native to North America). The oil from seeds, known as Evening Primrose oil, contains about 70% *cis*-linolenic acid and about 9% *cis*-gamma-linolenic acid (GLA). Evening Primrose oil is one of the most widely prescribed plant-derived medicines in the world. Sold under the trade name Epogam, it is recognized by the governments of Great Britain, Germany, Denmark, Ireland, Spain, Greece, South Africa, Australia and New Zealand as a treatment for eczema. A combination, known as Efamol Marine, used for eczema, contains 80% Evening Primrose Oil and 20% fish oil.

Evening Primrose Oil has become a frontline treatment in Great Britain for initial treatment of cyclical breast pain and fibrocystic breast disease.

Olax scandens Roxb.

Family ▶ *Olacaceae.*

Habitat ▶ Sub-Himalayas tract of Kumaon and Bihar, Orissa, Madhya Pradesh, Deccan and Western Ghats.

Ayurvedic ▶ Dheniaani, Karbudaar (doubtful synonym).

Siddha/Tamil ▶ Malliveppam, Kadalranchi.

Folk ▶ Rimil-beeri (Bihar).

Action ▶ Bark—used in anaemia and as a supporting drug in diabetes; also in the treatment of fever.

Oldenlandia umbellata Linn.

Synonym ► *Hedyotis umbellata* (Linn.) Lam.

Family ► *Rubiaceae.*

Habitat ► Bihar, Orissa, Travancore. Cultivated on the Coromandel coast.

English ► Indian Madder, Chay-Root.

Siddha/Tamil ► Inbooral.

Folk ► Chiraval (Maharashtra).

Action ► Leaves and roots—used in bronchitis, asthma, consumption.

The plant gave anthraquinone derivatives. The root gave alizarin, rubichloric acid and ruberythric acid, also anthraquinones. Purpurin, pupuroxanthin carboxylic acid, present in Madder (*Rubia tinctorum*), are almost entirely absent.

O

Olea europaea Linn.

Family ► *Olaeaceae.*

Habitat ► Native of Mediterranean region; cultivated in Jammu and Kashmir and Himachal Pradesh.

English ► Olive.

Unani ► Zaitoon.

Action ► Leaves and bark—febrifugal, astringent, diuretic, antihypertensive.

Oil—preparations are used for cholangiitis, cholecystitis, cholelithiasis, icterus, flatulence, meteorism, lack of bacteria in the intestines. Demulcent and mild laxative. Externally used for wound dressing and for minor burns, psoriasis and pruritus. (Included among unapproved herbs by *German Commission E.*)

Chemical investigations of two varieties—Ascotrinia and Ascolina—grown in Jammu region have shown that the characteristics of fruits and their oils are similar to those of European varieties.

Leaves of *Olea europaea* gave iridoid monoterpenes including oleuropein and oleuroside; triterpenes including oleanolic and maslinic acids; flavonoids including luteolin and apigenine derivatives. The oil contains glycerides of oleic acid about 70–80%, with smaller amounts of linoleic, palmitic and stearic acid glycerides.

The leaves exhibited hypotensive, antiarrhythmic and spasmolytic activities in animal studies. The oil exhibited contraction of gallbladder due to raising of the cholecystokinin level in the plasma.

India's requirements of olive oil are met by imports.

Onosma bracteatum Wall.

Family ► *Boraginaceae.*

Habitat ► Kashmir and Kumaon.

English ► Borage.

Ayurvedic ► Gojihvaa, Kharpatraa, Darvipatraa, Vrishjihvaa.

Unani ► Gaozabaan (related species).

Siddha/Tamil ► Ununjil.

Action ► Cooling, astringent, diuretic, cardiac tonic. Used for cold,

cough, bronchial affections; insomnia, depression, mental exhaustion; constipation, misperistalsis, jaundice; dysuria, urethral discharges; fevers.

The name Gaozaban is applied to six different plants, belonging to five genera. According to *The Wealth of India,* Gaozaban is derived not from this plant but from *Anchusa strigosa* Labill, which occurs in Iran. Kashmiri Gaozaban is derived from *Macrotomia benthamii. Coccinia glauca* is also used as Gojihvaa.

Borage has been equated with *Borago officinalis* Linn. (*Boraginacea.*).

Dosage ► Dried leaves and stems, flowers—3–6 g powder.

Onosma echioides
C. B. Clarke non Linn.

Synonym ► *Onosma hispidum* Wall. ex D. Don.

Family ► *Boraginaceae.*

Habitat ► Kashmir and Kumaon up to 1,000–1,500 m.

Unani ► Ratanjot (equated with *Onosma echioides* Linn., according to *National Formulary of Unani Medicine*).

Action ► Astringent and styptic. Root—bruised and used as application to eruptions. An ingredient of ointments for ulcers, scrofula, burns. Flowers—stimulant, cardiac tonic.

Ursolic acid and naphthoquinones, onosone A and B have been isolated from the root. Shikonin acetate is obtained from callus cultures of the plant.

The species, distributed in western Himalayas, is *Onosma echioides* C. B. Clarke non Linn.; *Onosma echioides* Linn. is an European species. A variety of this species, var. *kashmiricum* Johnson, is found in Kashmir. *Onosma hookeri* C. B. Clarke occurs in Sikkim and Bhutan.

Maharanga emodi (Wall.) DC., synonym *Onosma emodi* (Wall.) DC. (the Himalayas from Garhwal to Bhutan at altitudes of 3,500–4,000 m) is also known as Ratanjot and Shankhuli.

(Ratanjot is used in a generic sense to cover a range of red dye-yielding roots, rather than the root of a single species. As many as 15 plant species belonging to four different families are known as Ratanjot; five of them do not yield red dye. General properties and colour reactions attributed to Ratanjot resemble Alkanet from *Alkanna tinctoria* Tausch.)

Operculina turpethum
(Linn.) Silva Manso.

Synonym ► *Ipomoea turpethum* R. Br.

Family ► *Convolvulaceae.*

Habitat ► Throughout India up to 1,000 m; occasionally grown in gardens.

English ► Indian Jalap, Turpeth.

Ayurvedic ► Trivrta, Trivrtaa, Tribhandi, Triputaa, Saralaa, Suvahaa,

Rechani, Nishotra, Kumbha, Kaalaa, Shyaama, Shyaamaa.

Unani ▶ Turbud, Nishoth.

Siddha/Tamil ▶ Karunchivadai.

Action ▶ Root—purgative, anti-inflammatory (particularly used in rheumatic and paralytic affections; also in fevers, oedema, hepatic and haemophilic diseases).

White Turpeth is preferred to Black Turpeth as cathartic; the latter produces drastic purgation and causes vomiting, fainting and giddiness. White Turpeth is derived from *Marsdenia tenacissima* in folk medicine.

The active principle of *O. turpethum* is a glycosidic resin present in the drug up to 10%. It is similar to jalap resin and is concentrated mostly in the root bark. It contains an ether insoluble glycoside, turpethin, which constitutes about half of the resin and two ether soluble glycosides, alpha-and beta-turpethein (8 and 6% respectively).

Dosage ▶ Root—1–3 g powder. (*API*, Vol. III.)

Ophioglossum vulgatum Linn.

Family ▶ Ophioglossaceae.

Habitat ▶ Moist meadows in Great Britain. Found in the Himalayas, Bihar, Assam, Pune (Maharashtra), Annamalai and Shevaroy hills (South India); up to an altitude of 2,700 m.

English ▶ English Adder's Tongue. Serpant's Tongue.

Action ▶ Fern—antiseptic, styptic, vulnerary, detergent, emetic. The mucilaginous and astringent decoction of the fern is used in angina in Reunion. An ointment, prepared by boiling the herb in oil or fat, is used for wounds.

Ophioglossum pendulum L. (Assam) is used in the form of a scalp ointment for improving the hair growth. American Adder's Tongue is equated with *Erythronium americanum* Ker-Gawl (*Liliaceae*). The fresh leaves gave alpha-methylenebutyrolactone.

Ophiorrhiza mungos Linn.

Family ▶ *Rubiaceae.*

Habitat ▶ Khasi Hills up to 600–700 m, in Western Ghats and the Andaman Islands.

English ▶ Mongoose Plant.

Ayurvedic ▶ Sarpaakshi. (Gandhanaakuli is a wrong synonym. It is equated with *Aristolochia indica.*)

Siddha/Tamil ▶ Keerippundu.

Folk ▶ Sarahati. Mungus-vel (Maharashtra).

Action ▶ Root—bitter tonic. Leaves—used for dressing ulcers.

The roots contain starch, a resin and small amounts of a bitter amorphous alkaloid. Beta-sitosterol, 5-alpha-ergost-7-en-3-beta-ol and 5-alpha-ergost-8 (14)-en-3 beta-ol (as an ester) have been identified in the root. Leaves and stems contain traces of hydrocyanic acid.

Opuntia cochinellifera Mill.

Synonym ► *Nopalea cochenillifera* Salm-Dyck.

Family ► *Cactaceae.*

Habitat ► Indian gardens. Introduced into India towards the end of the 18th century.

English ► Cochineal Cactus. (A host for cochineal insect, *Dactylopius cacti* Linn.)

Siddha/Tamil ► Puchikalli.

Action ► Fruits—emollient, bechic. Mucilaginous joints—used as poultices in cases of articular rheumatism, inflammations, scalds, burns and skin diseases.

Opuntia dillenii (Ker-Gawl.) Haw.

Synonym ► *O. stricta* Haw. var. *dillenii* (Ker-Gawl.) Benson.

Family ► *Cactaceae.*

Habitat ► Native of Mexico; well-acclimatized throughout India.

English ► Prickly Pear, Slipper Thorn.

Ayurvedic ► Naagaphani, Kanthaari.

Unani ► Naagphani.

Siddha/Tamil ► Sappathikalli, Nagathali.

Action ► Leaves—applied as poultice to allay inflammation and heat. Fruit—baked and given in whooping cough.

Dried or fresh flowers of cactus (*opuntia* series)—astringent and haemostatic. An infusion is given in irritable bowel, mucous colitis, and prostatitis. Ash of the aerial portion, mixed with sugar candy, is given for 21 days for birth control in tribal areas of Andhra Pradesh.

The Plant is recommended for growing in high pollution zones for abating sulphur dioxide pollution.

Pods contain a polysaccharide, arbinogalactan. Betanin has been isolated from ripe fruits. Flowers contain the glycosides of isorhamnetin and quercetin, with smal amounts of the free flavonols.

Opuntia ficus-indica (Linn.) Mill., known as Prickly Pear or Indian Fig, is a spineless cactus, mostly cultivated in Indian gardens. Ripe fruits are nutritious. Flowers are astringent and reduce bleeding; used for diarrhoea and irritable bowel syndrome; also for enlarged prostate. The flower decoction exhibits a strong diuretic effect.

The cladodes are used as a topical anti-inflammatory remedy for oedemata and arthrosis, as regulators of smooth muscles in the treatment of whooping cough and as anti-infective agent.

The stem or their crude preparations showed hypoglycaemic effect in non-insulin-dependent diabetes mellitus patients (irrespective of its being heated or blended during preparation).

Neobetanin (14,15-dehydro betanin) is the major constituent in the fruit.

Opuntia vulgaris Mill.

Family ► *Cactaceae.*

Habitat ► Throughout the greater part of India.

English ► Prickly Pear.

Ayurvedic ► Naagaphani (var.).

Action ► In homoeopathy, a tincture made from the flowers and wood, is given for diarrhoea and splenomegaly.

The fresh stalks yielded calcium magnesium pectate which exhibited antihaemorrhagic action. A flavonoside has been obtained from dried flowers. It resembles rutoside in its action of inhibiting capillary fragility. The flavonoside on hydrolysis produces trihydroxy-methoxy-flavonol and glucose. The plant is reported to contain an alkaloid. It also yields a mucilage which gives arabinose and galactose.

O

Orchis latifolia Linn.

Family ► *Orchidaceae.*

Habitat ► Kashmir to Nepal at altitudes of 2,500–5,000 m in damp places.

English ► Orchis, Salep.

Ayurvedic ► Munjaataka, Saalam-misri, Saalam-panjaa. (*Eulophia campestris* Wall. is also equated with Munjaataka.)

Unani ► Saaleb, Khusyaat-us-Saalab, Saalab Misri.

Siddha ► Silamishri.

Action ► Considered aphrodisiac and nervine tonic by Unani physicians. Tuber—nutritive, demulcent, restorative. Given to convalescents suffering from chronic diarrhoea and bilious fevers. Allays irritation of gastro-intestinal tracts.

Orchis species (Salep) contain mucilage (up to 50%)–glucans, glucomannans (partially acetylized), starch (25%), proteins (5–15%).

The leaves of Orchis latifolia contain a glucoside, loroglossin. Most of the Salep used in Unani medicine is imported from Iran and Afghanistan.

Allium macleanii Baker (Afghanistan) is known as Baadashaahi (royal) Saalab, and is used as a substitute for Munjaataka.

Dosage ► Tuber—3–5 g powder. (*CCRAS.*)

Origanum majorana Linn.

Synonym ► *Majorana hortensis* Moench.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to Europe and Great Britain.

English ► Sweet Marjoram. (*Origanum vulgare* Linn., Wild Marjoram, occurs in Simla hills and in Kashmir valley.)

Ayurvedic ► Sukhaatmaka, Marubaka, Phanijjaka. (*Ocimum basilicum* is used as a substitute for Phanijjaka.)

Unani ► Marzanjosh.

Folk ► Maruae. Santhraa. Jangali Maruaa (*Origanum vulgare* Linn.).

Action ► Emmenagogue, antispasmodic, carminative, expectorant. Leaves and seed—astringent, antispasmodic. Warm infusion of herb—promotes suppressed menstrual flow.

The herb contains about 3% volatile oil comprising sabinene hydrate, sabinene, linalool, carvacrol, estrogole, eugenol and terpenes; flavonoids including luteolin-7-glucoside, diosmetin-7-glucoside, apigenin-7-glucoside; rosmarinic acid, caffeic acid; and triterpenoids such as ursolic acid, oleanolic acid, sterols.

Marjoram herb and oil exhibit antibacterial action. (*German Commission E.*) The herb contains arbutin and hydroxyquinone (a carcinogenic agent) in low concentrations. The herb is not suited for extended use. Topical application of hydroxyquinone leads to depigmentation of the skin. There is no reports of similar side effects with marjoram ointment. (*German Commission E.*)

Origanum vulgare Linn. (Wild Marjoram) contains volatile oil with a widely varying composition; major components include thymol, beta-bisabolene, caryophyllene, linalool and borneol; other constituents are similar to those of *O. majorana.*

The leaves of Wild Marjoram contain phenolic acids. The phenyl propionic acid and the phenyl glucoside showed antioxidant activity comparable to that of BHA, a synthetic antioxidant.

Wild Marjoram preparations are used for bronchial catarrh and disturbances of the gastrointestinal tract in Unani medicine.

Sweet Marjoram shows stronger effect on the nervous system than Wild Marjoram and gives better results in anxiety, headaches and insomnia.

Both the species have been included among unapproved herbs by *German Commission E.*

Oroxylum indicum Vent.

Family ► *Bignoniaceae.*

Habitat ► Throughout the greater part of India.

English ► Indian Trumpet Flower.

Ayurvedic ► Shyonaaka, Shoshana, Tuntuka, Kutannata, Madhukparna, Patrorna, Bhalluka, Prthushimba, Nata.

Siddha/Tamil ► Peruvaagai.

Folk ► Sonaa-paathaa.

Action ► Tender fruit—carminative, stomachic, spasmolytic. Seed—purgative. Root bark—astringent, antidiarrhoeal. Used for amoebic dysentery. Bark—antirheumatic, diuretic.

The leaves contained flavones and their glycosides including baicalein and scutellarein; also anthraquinone, aloe-emodin. Bark of the root gave chrysin, baicalein and oroxylin A. Bark also gave dihydrobaicalein. Heartwood yielded beta-sitosterol and an iso-flavone, prunetin.

Dosage ► Root—5–10 g powder; 25–50 g for decoction. (*API,* Vol. III.)

Orthosiphon grandiflorus Boldingh.

Synonym ► *O. aristatus* (Blume) Miq.
O. spiralis (Linn.) Merrill
O. stamineus Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Manipur, Naga and Lushai hills, Chota Nagpur, Western Ghats.

English ► Kidney Tea Plant, Java Tea.

Folk ► Mutri-Tulasi (Maharashtra).

Action ► Leaves—diuretic, used in nephrosis and severe cases of oedema. An infusion of leaves is given as a specific in the treatment of various kidney and bladder diseases including nephrocirrhosis and phosphaturia, also in rheumatism and gout.

Key application ► In irrigation therapy for bacterial and inflammatory diseases of the lower urinary tract and renal gravel. (*German Commission E.*)

Flower tops and leaves (samples from Indonesia) contained methyl ripariochromene A. In another sample, leaves also yielded several phenolic compounds including lipophilic flavones, flavonol glycosides and caffeic acid derivatives. Rosmarinic acid and 2,3-dicaffeoyl-tartaric acid (67% of total phenolics, 94.5% in hot water extract) were major compounds of caffeic acid derivatives.

The leaves also contain a high percentage (0.7–00.8) of potassium salts. Presence of orthosiphonin and potassium salts help in keeping uric acid and urate salts in solution, thus prevents calculi and other deposits. The leaf extract lowers blood sugar in diabetics, but not consistently.

Orthosiphon pallidus Royle, equated with the Ayurvedic herb Arjaka and Shveta-Kutherak and known as Ajagur and Naganda-baavari in folk medicine, is used for dysuria and colic.

Orthosiphon tomentosus Benth. var. **glabratus** Hook. f.

Synonym ► *O. glabratus* Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Orissa, Gujarat, South India, ascending up to 1,000 m in the hills.

Ayurvedic ► Prataanikaa (non-classical).

Folk ► Tulasi (var.), Kattu-thrithava (Kerala).

Action ► Plant—a decoction is given in diarrhoea. Leaves—applied externally to cuts and wounds.

Oryza sativa Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated all over India as a food crop.

English ► Rice.

Ayurvedic ► Shaali, Vrihidhaanya, Tandula, Nivara.

Unani ► Biranj Saathi.

Siddha/Tamil ► Nell.

Action ▶ Rice-water (a water decoction of rice)—demulcent and refrigerant in febrile and inflammatory diseases and in dysuria. Also used as a vehicle for compound preparations used for gynaecological disorders. It is regarded as cooling in haematemesis and epistaxis, and as diuretic.

The green clum or stalks—recommended in biliousness. Ash of the straw—used in the treatment of wounds and discharges. Lixiviated ash of straw is used as anthelmintic and in nausea.

The Ayurvedic Pharmacopoeia of India recommends the dried root in dysuria and lactic disorders.

The pigments occurring in coloured types of rice are a mixture of monoglycosides of cyanidin and delphinidin. The dark Puttu Rice of India contains a diglycosidic anthocyanin.

Dosage ▶ Root—50 g for decoction. (*API*, Vol. II.)

Osbeckia chinensis Linn.

Family ▶ *Melastomataceae.*

Habitat ▶ The Himalayas from Garhwal to Bhutan, North Bengal, Bihar and Khasi, Aka and Lushai hills.

Folk ▶ Bhui-lukham (Lushai).

Action ▶ Plant—anodyne, antipyretic, anti-inflammatory.

The plant contains the flavonoids, quercetin, kaempferol and hydrolysable tannins, besides gallic acid, methyl gallate and ellagic acid.

The flavonoids and tannins showed antioxidant activity. Ellagic acid suppressed increase in lipid peroxidation induced by CCl4 and Cobalt-60 irradiation and this effect was more than that of alpha-tocopherol. Gallic acid showed anti-inflammatory activity against zymosan-induced acute footpad swelling in mice.

Osmanthus fragrans Lour.

Family ▶ *Obleaceae.*

Habitat ▶ Native to China and Japan. Found in Kumaon, Garhwal and Sikkim.

Ayurvedic ▶ Vasuka (Also equated with Brihat Bakula.)

Folk ▶ Silang, Silingi, Bagahul, Buuk.

Action ▶ Diuretic, genitourinary tract disinfectant.

Flowers—antiseptic, insecticidal. Used for protecting clothes from insects.

The flowers yield an oil containing oleanolic and urosolic acids, betasitosterol, glycosides and a wax (0.04%) composed mainly of triacontane. The leaves are reported to contain a phillyrin-like glycoside.

Osmanthus suavis King, known as Silingi in Nepal and Chashing in Bhutan, is found in eastern Himalayas at altitudes of 2,700–3,000 m and in Aka hills in Assam. It is used as a var. of Vasuka.

Dosage ▶ Flower—500 mg to 1 g powder. (*CCRAS.*)

Osmunda regalis Linn.

Family ► *Osmundaceae.*

Habitat ► The Himalayas, Khasi hills and the Western Ghats at altitudes of 1,500–3,000 m.

English ► Royal Fern.

Action ► Fern—antispasmodic, astringent, an aqueous extract is administered for intestinal gripe; used externally in rheumatism; also prescribed in muscular debility. Fonds enter into diuretic drinks used for treating body swellings. Root—mucilaginous, styptic, stimulant.

The rhizomes contain phenolic, gallic, caffeic, *p*-coumaric, vanillic, salicylic, *p*-hydroxybenzoic and ferulic acids and catechol tannins (2.8%) which are responsible for fern's astringent activity. Biological activity of these tannins corresponds to that of 10% tannic acid.

O

Osyris wightiana Wall. ex Wight.

Synonym ► *O. arborea* Wall. ex DC. *O. quadriparita* Salzm. ex Decne.

Family ► *Santalaceae.*

Habitat ► Sub-tropical Himalaya, Madhya Pradesh, Tamil Nadu.

Folk ► Popli (Maharashtra); Paral (Karnataka, Tamil Nadu); Jhuri (Nepal); Dalmi, Dalmia (Garhwal, Kumaon).

Action ► Leaf—emetic.

The leaf contains 20% tannin. It gave *cis*-4-hydroxy-L-proline, and exhibited antiviral activity.

The heartwood is faintly fragrant and reported to be used for adulterating sandalwood.

Ougeinia dalbergioides Benth.

Synonym ► *Ougeinia oojeinensis* (Roxb.) Hochr.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Outer Himalayas and sub-Himalayan tract from Jammu to Bhutan up to an altitude of 1,500 m, and extending through the whole of northern and central India into the greater part of Deccan Peninsula.

English ► Chariot tree, Punjab Kino.

Ayurvedic ► Tinishaa, Tinisha, Syandana, Nemi, Sarvasaara, Ashmagarbhaka, Vajjala, Chitrakrt.

Siddha/Tamil ► Narivengai.

Folk ► Saanan.

Action ► Bark—febrifuge, antidiarrhoeal, spasmolytic.

The leaves and heartwood contained iso-flavonoids—dalbergion, hemoferritin and urgenin. Leaves, in addition, contained flavonoids—quercetin, kaempferol and leucopelargonidin. Stem bark gave triterpenes, lupeol and betulin.

Oxalis acetosella Linn.

Family ► *Oxalidaceae.*

Habitat ► Temperate Himalayas from Kashmir to Sikkim from 2,500 to 4,000 m and Nilgiris in Tamil Nadu.

English ► Common Wood-Sorrel.

Ayurvedic ► Chaangeri (related species).

Folk ► Tinpatiyaa, Amrul.

Action ► Diuretic and refrigerant. Used for urinary affections and fevers. (Sorrel is equated with *Rumex acetosa* Linn.)

Aerial parts gave 2′′-O-(beta-D-glucopyranosyl) isovitexin. The whole flowering plant contains 0.3–1.25% oxalic acid (high in fresh leaves and roots).

Oxalis corniculata Linn.

Family ► *Oxalidaceae.*

Habitat ► Throughout the warmer parts of India.

English ► Indian Sorrel.

Ayurvedic ► Chaangeri, Amlapatrikaa, Amlikaa, Chukraa, Chukrikaa, Chhatraamlikaa.

Unani ► Ambutaa bhaaji, Amutaa saag.

Siddha/Tamil ► Puliyarai.

Folk ► Tinpatiyaa, Ambilonaa.

Action ► Plant—boiled with butter milk is a home remedy for indigestion and diarrhoea in children. Used for tympanitis, dyspepsia, biliousness and dysentery; also for its anti-inflammatory, analgesic, antipyretic and antiscorbutic activities. Leaf paste is applied over forehead to cure headache.

The leaves contain the flavonoids, vitexin, isovitexin and vitexin-2′′-O-beta-D-glucopyranoside. The leaves contain 1.47% of lipid (dry weight), a rich source of essential fatty acids and alpha-and beta-tocopherol (1.58 and 6.18 mg/g dry basis, respectively.) They are a good source of vitamin C (125 mg/100 g), carotene (3.6 mg/100 g) and calcium (5.6% of dry material) but contain a high content of oxalates (12% of dry material).

The leaves and stem contain tartaric and citric acid; stems contain also malic acid.

An aqueous extract of the plant shows activity against *Micrococcus pyogenes* var. *aureus.* Expressed juice of the entire plant shows activity against Gram-positive bacteria.

Oxalis martiana Zucc. (native to America, naturalized in moist and shady placaes in temperate parts of India) is equated with Wood-Sorrel. It is known as Khatmitthi in Delhi and Peria-puliyarai in Tamil Nadu.

Dosage ► Whole plant—5–10 ml juice. (*API,* Vol. III.)

Oxyria digyna (L.) Hill.

Family ► *Polygonaceae.*

Habitat ► The Himalayas from Kashmir to Sikkim, in the alpine region at altitudes of 3,000–6,000 m.

Folk ► Chohahak, Amlu (Punjab). Kailaashi (Kashmir).

Action ► Refrigerant, antiscorbutic.

O

Oxystelma secamone (Linn.) Karst.

Synonym ► *O. esculentum* R. Br. *Sarcostemma secamone* (Linn.) Bennet.

Family ► *Asclepiadaceae.*

Habitat ► Throughout the plains and lower hills of India, including paddy fields and hedges rear semi-marshy places.

Ayurvedic ► Dugdhikaa, Duudhilataa, Duudhialataa .

Folk ► Usipallai (Tamil Nadu); Dugdhani (Maharashtra); Jala-dudhi (Gujarat).

Action ► Herb—antiseptic, depurative, galactogogue; decoction used as a gargle in stomatitis and sore throat. Latex—vulnerary. Fresh root—prescribed in jaundice.

A pregnane ester oligoglycoside (oxysine), a pregnane triglycoside (esculentin), a cardenolide (oxyline), two more cardenolides, oxystelmoside and oxystelmine, have been isolated from the roots.

P

Paederia foetida Linn.

Family ► *Rubiaceae.*

Habitat ► Central and Eastern Himlayas extending to Assam, West Bengal, Bihar, Orissa.

Ayurvedic ► Talanili, Gandhaprasaarini. (Prasaarini is also equated with Raaja-balaa, *Sida veronicaefolia.*).

Siddha/Tamil ► Talanili, Mudiyar Kundal.

Folk ► Gandhabhaaduli (Bengali).

Action ► Leaf—carminative, anti-inflammatory, astringent, spasmolytic, antidiarrhoeal, diuretic, antilithic. Root— anti-inflammatory. Used for rheumatic affections, piles, inflammations of the liver, spleen and chest.

Aerial parts contain *epi*-friedelanol, embelin and beta-sitosterol. Leaves and stems gave iridoid glycosides, sitosterol, stigmasterol, campesterol, ursolic acid, hentriacontane, hentriacontanol, ceryl alcohol, palmitic acid and methyl mercaptan. The foetid smell is due to methyl mercaptan.

All parts of the plant have been employed for rheumatic affections.

A related species, *Paederia scandens* (Lour.) Merill, synonym *P. tomentosa* Blume, is known as Gandha Prasaarini. The iridoid glucosides, paederoside, paederosidic acid and scandosides have been isolated from the plant.

Dosage ► Plant—10–20 ml juice; 50–100 ml decoction. (*CCRAS.*)

Paeonia emodi Wall. ex Royle.

Family ► *Paeoniaceae.*

Habitat ► Northwestern Himalaya from Kashmir to Kumaon at 2,000–3,000 m.

English ► Himalayan Paeony.

Unani ► Ood Saleeb, Ood Gharqi, Phaavaaniaa.

Folk ► Root—used in nervous affections, uterine diseases, as a blood purifier. Flower—antidiarrhoeal. Seed—emetic, cathartic. Plant—CNS depressant, hypothermic, diuretic, anti-inflammatory.

The root contains an essential oil, with salicylaldehyde as the chief component, a fixed oil, benzoic acid and sucrose. The plant gave Gallo tannin and glucogallin.

Paeonia officinalis Linn.

Family ► *Paeoniaceae.*

Habitat ► Indigenous to Great Britain.

English ► Paeony.

Unani ► Ood Saleeb, Ood Gharqi.

Action ► Root—antispasmodic, sedative, smooth muscle relaxant, vasodilatory, hypotensive,

anti-inflammatory, analgesic, emmenagogue, hepatoprotective. Flower—used for diseases of mucous membranes, fissures, anal fissures associated with haemorrhoids, also for ailments of the respiratory tract, nervous conditions and skin diseases. Root—used for arthritis, neuralgia, neurasthenia, migraine, epilepsy, allergic disorders, whooping cough and painful spasms.

The herb gave monoterpene ester glucosides of the pinen-type (including paeoniflorin); anthocyanin including paeonin; tannins (pentagalloyl glucose); flavonoids including kaempferol glycosides.

Paeoniflorin shows a smooth muscle relaxant, vasodilatory, anti-inflammatory, immunostimulating and some CNS depressant activity in animal studies. Pentagalloyl glucose exhibited antiviral activity in animal studies *in vitro* against herpes simplex.

German Commission E included Paeony (flower and root) among unapproved herbs. *The Pharmacopoeia of People's Republic of China* indicates the use of the root in dementia, headache and vertigo. (*WHO.*)

Panax pseudoginseng Wall.

Family ► *Araliaceae.*

Habitat ► Western Himalayas, Pithoragarh district of Uttaranchal.

English ► Indian Ginseng, Indian Pseudoginseng.

Ayurvedic ► In Indian medicine, *Panax quinquefolium* Linn. and *Panax schinseng* Knees have been equated with Lakshmanaa.

Action ► Adaptogen, digestive relaxant, old-age revitalizer. Sustains nerves and immune system in physical exhaustion and during convalescence. Antiarrhythmic (used for angina). Activities comparable with Korean ginseng.

Indian pseudoginseng, including subspecies *himalaicus* and its varieties, variety *angustifolius* and variety *bipinnatifidus,* has been found to be a rich source of oleanolic acid saponins, while dammarane saponins (panaxadiol and panaxatriol) are present in minor quantities. *Panax burkillianus* Bennet & Viswan and *P. sikkimensis* Banerjee are also related to the commercial ginseng.

Panax quinquefolium (American Ginseng) has been introduced into India in the Kashmir valley during 1983. It is rich in dammarane saponins. The air-dried roots of the plant, introduced in India, contain total saponin content of 11.5%. The saponins isolated include ginsenosides Rb1, Rb2, Rb3, Rc, Rd, Re, Rg1, pseudoginsenoside F11 and chikusetsu saponin V; the major saponin being ginsenoside Rb1. The saponin fraction of the root yielded panaxadiol, panaxatriol and oleanolic acid.

Ginsenosides Rb and Rc are 'diols', while Rg is a 'triol'. ('triol' group is arousing, 'diol' is sedative.) In American ginseng 'diols' predominate.

Panax pseudoginseng, equated with Himalayan ginseng (*Natural Medicines Comprehensive Database,* 2007), is believed to dilate the coronary vessels, re-

duce vascular resistance and improve the coronary collateral circulation. It increased blood flow while reducing blood pressure.

Panax schiseng, synonym *P. ginseng* Mey. (Asiatic or Chinese Ginseng) is cultivated in northern China, Korea and Japan.

Pandanus facicularis Lam.

Synonym ► *P. tectorius* auct. non Soland ex Parkinson.
P. odoratissimus Linn. f.

Family ► *Pandanaceae.*

Habitat ► Sea coast of the Indian Peninsula on both sides, and the Andaman Islands.

English ► Screw Pine.

Ayurvedic ► Ketaka, Ketaki, Suuchikaa pushpaa, Jambuka, Trinshunya, Ketakark, Krakchhada.

Unani ► Keoraa.

Siddha/Tamil ► Thazhai, Thalay.

Action ► Flower—carminative, stomachic, cooling, antiseptic. Used for headache, ulcers, dysuria, scabies and other skin diseases. Root—used for osteoarthritis, leucorrhoea and amenorrhoea; contraindicated during pregnancy. Leaves—used for skin diseases, small pox, scabies, leprosy. *The Ayurvedic Pharmacopoeia of India* recommends the decoction of the root in abdominal inflammation. Oil and otto—stimulant, antispasmodic, antirheumatic.

The chief constituent of the oil is methyl ether of beta-phenylethyl alcohol. The oil also contains diterpene, *d*-linalool, phenylethyl acetate, citral, phenylethyl alcohol, ester of phthalic acid, fatty acids and stearoptene.

The leaves contain the piperidine alkaloids.

Dosage ► Root—29–30 g for decoction (*API,* Vol. I); flower linctus—25–30 ml. (*CCRAS.*).

Pandanus utilis Bory.

Family ► *Pandanaceae.*

Habitat ► Native of Malagasy; grown in Indian gardens.

Ayurvedic ► Ketaki (related species).

Action ► Root—a decoction is used for the treatment of venereal diseases.

Panicum miliaceum Linn.

Family ► *Poaceae.*

Habitat ► Cultivated mainly in Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu.

English ► Common Millet, Proso Millet, Hog Millet.

Ayurvedic ► Chinaaka, Cheenaa.

Unani ► Chinaa Ghaas, Faaluudaa.

Siddha/Tamil ► Panivaragu.

Folk ► Chenaa, Chi-Tibet.

Action ► Seeds (grains)—demulcent; used in diarrhoea. Plant—antigonorrhoeal.

The seedlings contain an alkaloid hordenine (beta-*p*-hydroxyphenethyl dimethylamine). Saponins afforded diosgenin and yamogenin isolated from the leaves.

The grains contain 10–18% of proteins which include prolamin, glutelin and smaller amounts of albumin and globulin. The protein has a biological value of 56% and a digestibility coefficient of 91% at 10% level of protein intake.

In Indian medicine, Chinaaka and Kangu (*Setaria italica* L. Beauv.) are synonyms.

Papaver rhoeas L.

Family ► *Papaveraceae.*

Habitat ► Kashmir and throughout the plains of North India; cultivated in gardens.

English ► Corn Poppy, Red Poppy.

Ayurvedic ► Rakta Posta.

Siddha/Tamil ► Sivappu, Kasakasa.

Folk ► Laal Posta, Laal Kaskas.

Action ► Latex from capsules—narcotic. Petal—expectorant, antitussive, sudorific. Used for diseases of the respiratory tract, for disturbed sleep and as a sedative for the relief of pain. (Included among unapproved herbs by *German Commission E.*)

The petals contain cyanidine derivatives. An alkaloid rhoeadine is present in leaves and flowers (0.031%), unripe capsules (0.035%) and in roots (0.015%). The capsules contain morphine, thebine and narcotine and meconic acid.

Other species, commonly grown in Indian gardens, are *P. nudicaule* Linn. (Iceland Poppy) and *P. orientale* (Oriental Poppy). *P. nudicaule* plants with yellow flowers are more cyanogenetic than those with red or white flowers. *P. orientale* contains 0.16% alkaloids, which include thebaine, isothebaine, protopine, glaucidine and oripavine. Isothebaine stimulates and later depresses the central nervous system.

Papaver somniferum Linn.

Family ► *Papaveraceae.*

Habitat ► Native to Asia; now grown in Uttar Pradesh, Punjab, Rajasthan and Madhya Pradesh.

English ► Opium Poppy.

Ayurvedic ► Ahiphena, Aaphuuka. Post-daanaa (seed).

Unani ► Afyum. Tukhm-e-khashkhaash (seed).

Siddha/Tamil ► Kasakasa (seeds).

Action ► Opium is obsolete as a drug. Narcotic, sedative, hypnotic, analgesic, sudorific, anodyne, antispasmodic. Crushed poppyheads were in use as a topical poultice for crippling pain in terminal diseases.
Poppy seed—nutritive, demulcent, emollient, spasmolytic, devoid of narcotic properties. Specific against obstinate constipation, also used in catarrh of the bladder. Poppy

seed oil is also free from narcotic properties. Used against diarrhoea, dysentery and scalds.

Opium contains isoquinoline alkaloids; the major one is morphine with narcotine, codeine, papaverine and thebaine. Poppy seeds, used in Indian medicine, do not contain alkaloids. The seeds contain thiamine 420, riboflavin 49, folic acid 30, pantothenic acid 2667 and niacin 1877 mcg/100 g. The seed oil (from Turkey) contains gamma-tocopherol 220, alpha-tocopherol 40 and beta-tocopherol 20 mcg/100 g. Some low-molecular proteins (15% of total protein) have been isolated, along with cysteine, glutamic acid and arginine. The seeds yield a fatty oil (45%) containing palmitic, stearic, oleic, linoleic and linolenic acids.

The extract of seeds showed highly significant antisecretory (antidiarrhoeal activity) against *E. coli* enterotoxin-induced secretory responses in experimental animals.

The triglycerides isolated from seeds showed anti-tumour activity against *Ehrlich's ascites* in mice.

The aqueous extract of seeds showed marked hypoglycaemic activity when administered to glucose-loaded and alloxan diabetic rats.

The seeds were found to increase the activity of carcinogen detoxifying enzyme, glutathione-S-transferase by more than 78% in the stomach, liver and oesophagus in mice.

Following *Papaver* sp. are found in India:

P. argemone Linn. (indigenous to the Mediterranean region; commonly grown in gardens in India) contains 0.15% of alkaloids including rhoeadine, protopine, and anthocyanins. Petals are sudorific.

P. dubium Linn. (North-western Himalaya form Kashmir to Garhwal; as a winter weed in North Indian plains) contains rhoeagenine as the principal alkaloid, besides rhoeadine, protopine. Petals contain cyanidin B and pelargonidin C. Petals are sudorific.

P. hybridum Linn. (gardens of Punjab and Uttar Pradesh) is diaphoretic (petals). Plant latex contains alkaloids including berberine, coptisine, pahybrine, papaverrubines A, B, D and E and sanguinarine. Plant also gave glaucine and glucamine.

P. nudicaule Linn. (Gulmarg, Kashmir, at altitudes of 3,300–3,600 m), known as Iceland Poppy, gave alkaloids including papaverrubines B and D; leave gave cyanogenic glycosides including dhurrin and triglochinin. The flower and fruit are mild diaphoretic.

P. orientale Linn. (indigenous to Mediterranean region; grown in Indian gardens), known as Oriental Poppy, contains 0.16% of alkaloids including thebaine, isothebane, protopine, glaucidine and oripavine. Latex from poppy capsule is narcotic.

Paris polyphylla Sm.

Family ► *Liliaceae.*

Habitat ► Temperate Himalayas from Simla to Bhutan and in Lushai and Aka Hills.

Ayurvedic ► Haimavati, Shvetavachaa.

Folk ► Baal-bach.

Action ► Plant—sedative, analgesic, haemostatic, anthelmintic.

The rhizome contains a glucoside, alpha-paristyphnin, which exhibited a depressant action on carotid pressure, myocardium, and respiratory movements experimentally. It produced vasoconstriction in kidney, but vasodilation in the spleen and limbs, and stimulated isolated intestines.

Parmelia perlata (Huds.) Ach.

Family ► *Parmeliaceae.*

Habitat ► Cultivated in Kashmir hills and the Himalayas.

Ayurvedic ► Shaileya, Shaileyaka, Shilaapushpa, Shilaadaaru, Shailaka, Shilodbhava, Shaila, Shailpushpa. Kaalaanu-saarthaka, Bhuri-charilla, Sthavira, Vrddha, Shitashiva.

P

Unani ► Charelaa.

Action ► Astringent, resolvent, diuretic. Used externally for pain in renal and lumbar regions. Also used as an ingredient in cosmetic preparations.

The lichen contains lecanoric acid and atranorin.

Several lichen species contain abundant quantities of usnic acid which exhibits antimicrobial and antifungal activity and is immunologically active in contact dermatitis.

The Ayurvedic Pharmacopoeia of India recommends the thallus in dysuria.

Dosage ► Whole thallus—1–3 g powder. (*API,* Vol. III.)

Parthenium hysterophorus Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Tropical and subtropical countries of the world.

English ► Congress Grass.

Folk ► Pichhi, Machhipatri.

Action ► Anti-amoebic, antidysenteric, febrifuge, analgesic, emmenagogue.

The grass was introduced into India during 1950 s (it first appeared in Pune).

The grass exhibits *in vitro* anti-amoebic activity against axenic and polygenic cultures of *Entamoeba histolytica,* comparable to the standard drug for amoebiasis, Metronidazole.

Parthenin and some of its derivatives exhibited significant antimalarial activity against a multi drug-resistant strain of *Plasmodium falciparum.*

The main toxic constituent of the grass responsible for causing dermatitis and other forms of allergy are parthenin and coronopilin. Parthenin in present up to 8% in the capitulum and 5% in the leaves.

Parthenocissus himalayana (Royle) Planch.

Synonym ► *Vitis himalayana* Brandis.

Family ► *Vitaceae.*

Habitat ► Throughout the Himalayas.

Folk ► Kandur (Jaunsar), Philunaa (Garhwal) Laderi (Kumaon).

Action ► Bark and twigs—astringent and expectorant.

Paspalum scrobiculatum Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated throughout India.

English ► Kodo millet.

Ayurvedic ► Kodrava, Korduusha.

Siddha/Tamil ► Varagu.

Folk ► Kodo.

Action ► Plant—used as a CNS drug for treating schizophrenia and psychoses.

The plant contains hentriacontanol, hentriacontanone and sitosterol. The grains have often been reported to cause poisoning in men and animals when used as a food; non-poisonous types have been reported from Tamil Nadu.

Passiflora edulis Sims.

Family ► *Passifloraceae.*

Habitat ► Native of Brazil; cultivated in Tamil Nadu, Kerala and Andhra Pradesh, in North India in Punjab and Himachal Pradesh.

English ► Purple Granadilla, Passion Fruit.

Action ► Juice from purple fruit—a good source of ascorbic acid (contains up to 75 mg/100 g), carotene and sugars.

The juice from the yellow variety (equated with *Passiflora edulis* f. *flavicarpa*) contains lesser amounts of ascorbic acid and sugars.

The purple Passion fruit contains the C-glucoside, beta-ionyl-beta-D-glucopyranoside. A protease inhibitor (PEPI) has been isolated from the juice. PEPI inhibited trypsin and chymotrypsin activities, but did not inhibit papain activity. The esters and terpenoids form the major part of fruit components. The terpenoids include a number of monoterpenes (including hydroxylated linalool derivatives), and monoterpene glycosides. Norterpenoid aglycones have also been found.

The yellow Passion fruit contains sulfur-containing volatiles, acetates, butanoates and hexanoates of 3-mercaptohexanol. The leaves contain C-glycosylflavonoids.

Passiflora foetida Linn.

Family ► *Passifloraceae.*

Habitat ► Native to America; found willd in Uttar Pradesh, Karnataka and Tamil Nadu.

English ► Stinking Passion Flower.

Siddha/Tamil ► Siru Ponaikalli.

Action ► Leaves and roots—emmenagogue, antihysteric. Fruits—emetic. A decoction is used for biliousness and asthma (for expelling bile and cough).

The plant contains C-glycosides of apigenin and luteolin. Apigenin-8-C-glucoside has been detected in the plant.

P

Passiflora incarnata Linn.

Family ► *Passifloraceae.*

Habitat ► Native of South-east America; grown in Indian gardens.

English ► Wild Passion Flower, Maypop.

Action ► Flowering and fruiting dried herb—mild sedative, hypnotic, tranquilizer, hypotensive, vasodilator, antispasmodic, anodyne, anti-inflammatory,

Key application ► In nervous restlessness, irritability and difficulty in falling asleep. (*German Commission E, ESCOP, The British Herbal Compendium, The British Herbal Pharmacopoeia, WHO.*) *The British Herbal Compendium* also indicated it in neuralgia, dysmenorrhoea, and nervous tachycardia.

P

The herb contains flavonoids (up to 2.5%), in particular C-glycosylflavones; cyanogenic glycoside, gynocardine.

The alkaloid harman has been isolated, but the presence of harmine, harmaline, harmol and harmalol has been disputed. The alkaloid and flavonoids are reported to have sedative activity in animals. Apigenin exhibits antispasmodic and anti-inflammatory activity.

Passion Flower was formerly approved as an OTC sedative in the USA, but it was taken off the market in 1978 because safety and effectiveness had not been proven. An animal study in 1977 suggested that apigenin binds to central benzodi-zepine receptors (possibly causing anxiolytic effects). (*Natural Medicines Comprehensive Database,* 2007.)

The drug is used in homoeopathic medicine for epilepsy.

The herb exhibits a motility-inhibiting effect in animal experiments.

Passion Flower, used as an adjunct to clonidine, was superior to clonidine for mental symptoms of opiate withdrawal. (Sharon M. Herr.)

Passiflora laurifolia Linn.

Family ► *Passifloraceae.*

Habitat ► Native of tropical America; grown in Indian gardens.

English ► Water-lemon, Jamaica Honey Suckle.

Action ► Leaves—anthelmintic. Seeds—hypnodil. Fruit—edible. Plant—poisonous (the foliage produces hydrocyanic acid).

The fruit pulp contains pantothenic acid (1.55 mg/100 g); leaves contain 387 mg/100 g vitamin C.

Passiflora quadrangularis Linn.

Family ► *Passifloraceae.*

Habitat ► Native of tropical America; grown in Indian gardens.

English ► Giant Granadilla.

Action ► Fruit—edible; contains 64 mg/100 g ascorbic acid; narcotic when eaten in excess. Leaves, the peel and seeds of green fruit, and roots—cyanogenetic. Roots—poisonous.

The root contains an alkaloid passiflora which is identical with harman from *Passiflora incarnata*.

Pastinaca sativa Linn.

Synonym ► *Peucedanum sativum* Benth. & Hook. f.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Europe; grows in cool climate in India. (Hollow Crown, Student and Large Guernsey are Indian horticultural varieties.)

English ► Parsnip.

Action ► Above ground parts—diuretic, carminative (eaten as a vegetable and salad), used for kidney disorders. Root—used for kidney disorders, fever and as a diuretic and analgesic.

The parsnip is a rich source of coumarins (1.7% dry weight). The coumarin fraction of the fruit extract inhibits growth of cancer cells (*HeLa*-S3)cultured in the dark. The fruit contains small amounts of photoactive furocoumarins which are phototoxic. (Severe dermatitis results after contact with the furocoumarin in the presence of light.) The fruit contains xanthotoxin (0.1%), imperatorin (0.17%) and bergapten (0.38%). Coumarin, pastinacin, isolated from the fruit, showed spasmolytic action.

Pastinaca secacul Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Europe.

English ► Wild Parsnip.

Unani ► Shaqaaq-ul-Misri.

Action ► Root—galactagogue, aphrodisiac, spermatogenetic. An important ingredient of Unani compounds for oligospermia, low sexual drive and debility.

Shaqaaq-ul-Misri has also been equated with *Trachydium lehmanni* Benth. In Kashmir, *Eryngium caeruleum* Bieb (*Umbelliferae*) and in Chakrata, *Polygonatum verticillatum* All. (*Liliaceae*) are known as shaqaaqul (also Dudhaali).

Polygonatum verticillatum rhizomes are used in Tibetan medicine for emaciation and senility. The dried rhizomes contain diosgenin.

Paullinia asiatica Linn.

Synonym ► *Limonia oligandra* Dalz. *Toddalia aculeata* Pers.

Family ► *Rutaceae.*

Habitat ► Found in Konkan and Maharashtra.

English ► Lopez Root tree, Wild Orange tree, Forest Pepper.

Ayurvedic ► Kaanchana, Dahana.

Siddha/Tamil ► Kattu Milagu, Milagaranai.

Folk ► Jangali Kaalimirchi, Limri (Maharashtra).

Action ► Root bark—bitter, febrifuge, diaphoretic, antiperiodic. Infusion used in constitutional debility and convalescence after febrile and other exhausting diseases.

The root gave coumarins, including toddanol, todhanone, toddasin, pimpinellin, toddalolactone; alkaloids, including toddaline, toddalnine.

Pavetta indica Linn.

Synonym ► *P. tomentosa* Roxb. ex Sm.

Family ► *Rubiaceae.*

Habitat ► Throughout greater part of India, ascending to an altitude of about 1,500 m in the Himalayas, also recorded from the Andamans.

English ► White-Pavetta.

Ayurvedic ► Papata, Kathachampaa.

Siddha/Tamil ► Pavattai.

Folk ► Paapadi (Maharashtra).

Action ► Root—bitter and aperient. Prescribed in visceral obstructions, renal dropsy and ascites. Leaves—used for fomenting piles and for haemorrhoidal pains. The root bark contains *d*-mannitol.

P

Pavonia odorata Willd.

Family ► *Malvaceae.*

Habitat ► North-West India, Bengal and Konkan.

English ► Fragrant Sticky Mallow.

Ayurvedic ► Vaalaka, Baalaka, Baala, Barhishtha, Hrivera, Ambu, Jala, Nira, Paya, Toya, Udichya, Vaari, Muurdhaja. Sugandhbaalaa (also equated with *Valeriana Jatamansi*). In the South, *Celus vettiveroides* is equated with Baalaka.

Siddha/Tamil ► Peraamutti, Kastoori vendai.

Action ► Plant—anti-inflammatory and spasmolytic. Used in rheumatic affections. Root—stomachic, astringent, demulcent. Used in dysentery, haemorrhages from intestines; ulcers and bleeding disorders.

The roots gave an essential oil containing isovaleric acid, isovaleraldehyde, armomadendrene, pavonene, alpha-terpinene, azulene and pavonenol.

The plant exhibits antiparasitic activity against *Entamoeba histolytica.*

Pavonia zeylanica Cav.

Family ► *Malvaceae.*

Habitat ► Throughout greater part of India.

Siddha/Tamil ► Sithamutti, Mammatti, Peraamutti.

Action ► Plant—purgative, anthelmintic, febrifuge.

The stem gave a saponin, pavophylline, and a keto-ester, methyl 19-ketotetracosanoate.

Pedalium murex Linn.

Family ► *Pedaliaceae.*

Habitat ► Throughout the plains of India.

English ► Caltrops (bigger var.).

Ayurvedic ► Brihatgokshura, Kshouraka, Trikantaka, Gokantaka, Swaadukantaka, Bhakshantaka.

Unani ► Khaar-e-khasak Kalaan, Gokharu Kalaan.

Siddha/Tamil ► Peru-neranji, Annai-neringi.

Action ► Fruit—used for spermatorrhoea, nocturnal emissions, menstrual irregularities, puerperal diseases, genitourinary disorders, difficult micturition, chronic cystitis, renal calculus. Root—antibilious.

The stem and fruits contain flavonoids pedalitin and its glucoside (pedaliin), diometin, dinatin and its derivatives. The fruits contain nonacosane, tritriacontane, triacontanoic acid, sitosterol-beta-D-glucoside, rubusic acid, luteolin as major constituents. Leaves and fruits yield phenolic acids which include caffeic, protocatechuic, *p*-coumaric and ferulic acids. Flowers gave dinatin, quercetin and quercetin-7-glucoside.

Aqueous extract of the fruit is reported to produce *in vitro* inhibitory effect on crystallization in urinary lithiasis. The solubility of uric acid in aqueous extract is reported to be 45% more than in water alone.

The plant extracts exhibit diuretic activity.

Dosage ► Fruit, root—3–5 g powder; 50–100 ml. decoction. (*CCRAS.*)

Pedicularis pectinata Wall.

Family ► *Scrophulariaceae.*

Habitat ► The Himalayas from Kashmir eastwards at altitudes of 2,000–4,300 m, extending to Sikkim.

English ► Lousewort.

Folk ► Mishran, Michren (Punjab), Lugro-maarpro (Kashmir).

Action ► Leaves—astringent, haemostatic, diuretic.

The herb is closely related to Eyebright (*Euphrasia officinalis* Linn.) of the same family, found in the Temperate Himalayas from Kashmir to Kumaon. Eyebright is astringent and bacteriostatic.

Pedilanthus tithymaloides Poir.

Family ► *Euphorbiaceae.*

Habitat ► Native to West Indies; cultivated as an ornamental.

English ► Slipper Plant, Bird-Cactus.

Folk ► Vilaayati-sher (Maharashtra), Naagaphani, Naagadaman (Madhya Pradesh).

Action ► Latex—used for warts, leucoderma, venereal diseases. Root—emetic (used in West Indies as Ipecacuanha).

An extract of the air-dried and powdered whole plant contains octacosanol, cycloartenone, oxime and beta-sitosterol.

The latex from the stem contains the proteolytic enzyme, pedilanthain. It exhibited anti-inflammatory activity in carrageenan-induced rat paw oedema and was more effective than the control

drug phenylbutazone. The enzyme also showed anthelmintic property.

The leaves contain *n*-hentriacontanol and dehydrodammaronol-A. The root gave azafrin.

Peganum harmala Linn.

Family ► *Zygophyllaceae.*

Habitat ► Throughout Northern and Northwestern India, and in drier regions of Deccan.

English ► Wild Rue; Foreign Henna, Syrian Rue.

Ayurvedic ► Haramal, Isband.

Siddha/Tamil ► Simaiyaravandi, Simaiyalavinai.

Action ► Plant—emmenagogue, abortifacient. Seeds—narcotic, hypnotic, antispasmodic, anodyne and emetic; used in asthma, hiccough, colic, neuralgia, hysteria, dysmenorrhoea; used as abortifacient (properties similar to ergot, savine and rue). (Dried seeds constitute the drug Harmal of Indian medicine.)

The plant gave flavonoids—kaempferol, quercetin and acacetin. Aerial parts and seeds contain alkaloids—harmine, harmaline and harmalol (called harman alkaloids). Harman alkaloids from the seeds have been suggested for use in nervous diseases, and as coronary dilators and embolic. Harmol exhibits hypertensive activity. Harmine, vasicinone, deoxyvasicinone and 8-hydroxy glucosylharmine exhibit antitumour activity.

The alkaloids, harmine, harmaline and harmol exhibit antibacterial and antifungal activity.

The aqueous extract of seeds exhibited significant antiviral activity *in vitro* against herpes virus *hominis* type 1, slight activity was also observed against influenza viruses A and B. The plant extract exhibits significant analgesic activity.

Pelargonium graveolens L'Hert.

Family ► *Geraniaceae.*

Habitat ► Introduced into India in the Shevroy hills of Tamil Nadu; cultivated largely in the Nilgiri and Palni hills of Tamil Nadu.

English ► Geranium.

Action ► Oil—antifungal.

Geranium oil produced from the plant grown in the temperate region at high altitudes is rich in menthone, citronellol, nerol and geraniol; while the oil produced from the plants grown at lower altitudes is rich in isomenthone, linalool and citronellyl formate.

Geranium oil and its constituents are reported to exhibit marginal antitumour activity.

The oil also exhibits *in vitro* antifungal activity.

Peltophorum pterocarpum Backer ex K. Heyne.

Family ► *Caesalpiniaceae.*

Habitat ► Coastal forests of the Andaman Islands.

English ▶ Copper Pod, Rusty Shield-Bearer.

Siddha/Tamil ▶ Ivalvagai, Perungondrai.

Action ▶ Bark—used for dysentery; also used as a constituent of gargles, tooth-powders and lotions for sores and muscular pains.

The bark contains 20.8% of a catechol type of tannin and 9.5% non-tans. The wood and leaves also contain tannin.

The pods contain bergenin which exhibits anti-inflammatory activity in carrageenan-induced rat paw oedema and is found to be equipotent to phenylbutazone.

Aqueous extract of leaves and ethanolic extract of flower exhibit antifungal activity.

Pentapetes phoenicea Linn.

Family ▶ *Sterculiaceae.*

Habitat ▶ A shrub cultivated as an ornamental throughout the hotter parts of India.

Ayurvedic ▶ Bandhujiva, Bandhuuka, Arkavallabha.

Folk ▶ Gul-dupahariaa.

Action ▶ Capsule—mucilaginous, used for the diseases of the bowels; a decoction is used as emollient. Root—astringent, antibilious, antiphlegmonous, febrifuge.

Pentatropis microphylla W. & A.

Synonym ▶ *P. capensis* (Linn. f.) Bullock.

Family ▶ *Asclepiadaceae.*

Habitat ▶ West Bengal, Gujarat and Peninsular India.

Ayurvedic ▶ Kaakanaasaa, Kaakanaasikaa, Kaakaangi, Kaaktundphalaa, Shringiritti.

Siddha/Tamil ▶ Uppilankodi.

Folk ▶ Singarauti (Gujarat). Amarvel.

Action ▶ Plant—antifungal, antiseptic, keratolytic; used in various skin conditions.

The plant gave *n*-octacosanol, alpha-amyrin, friedelin, beta-sitosterol. An appreciable amount of salicyclic acid has been isolated from the plant. The plant also yields a cardiac glycoside.

Dosage ▶ Plant—50–100 ml. decoction. (*CCRAS.*)

Pentatropis spiralis Decne.

Synonym ▶ *P. cynanchoides* R. Br.

Family ▶ *Asclepiadaceae.*

Habitat ▶ A climber found in Punjab, Delhi, Upper Gangetic Plain, Rajasthan and Gujarat.

Ayurvedic ▶ Kaakanaasaa (related species).

Folk ▶ Ambarvel, Vanaveri (Punjab).

Action ▶ Root—astringent, antigonorrhoeic, alterative. Plant—emetic, purgative.

An acyclic diterpene ester, *cis*-phytyl-*l*-palmitate, together with the triterpenes, squalene, *n*-taraxasterol and taraxasterol, has been isolated from the plant.

Pergularia extensa N. E. Br.

Synonym ► *P. daemia* (Forsk.) Chiov.

Family ► *Asclepiadaceae; Periplocaceae.*

Habitat ► Throughout India and hotter parts.

English ► Hairknot Plant, Whitlow Plant.

Ayurvedic ► Uttamaarani, Vrischikaali, Vishaanikaa. Phalakantaka. Ajashringi is a doubtful synonym.

Siddha/Tamil ► Utthaamani, Veliparuthi.

Folk ► Utaran.

Action ► Plant—Uterine stimulant, tones up urinary bladder, stimulates gastric secretion, expectorant, emetic. Leaf—used for amenorrhoea, dysmenorrhoea; externally applied to carbuncles.

The plant gave betaine, a polypeptide, hentriacontane, lupeol, alpha-and beta-amyrin, beta-sitosterol as major constituents. Seeds and stems gave cardenolides—calactin, calotropin, calotropagenin, uzarigenin and coroglaucigenin.

The plant extract exhibits stimulating action on uterine and other involuntary muscles. The extracts cause rise in arterial blood pressure, increase in movement and tone of urinary bladder, and stimulation of gastric secretions. An aqueous extract of the leaves shows antibacterial activity against *E. coli* and *Micrococcus pyogenes* var. *aureus.*

Pericampylus glaucus (Lam.) Merill.

Family ► *Menispermaceae.*

Habitat ► Hill forests of Sikkim, Northern Bengal and Assam.

Folk ► Baarak-kaant (Maharashtra), Goriaa-loti (Assam).

Action ► Leaves—an infusion is used for asthma and high fever. Pounded leaves are applied in headache. The mucilage in water is used for arresting falling of hair.

The bark contains a non-toxic principle. The root is reported to contain a narcotic alkaloid.

Perilepta auriculata (Nees) Bremek.

Synonym ► *Strobilanthes auriculatus* Nees.

Family ► *Acanthaceae.*

Habitat ► Upper Gangetic Plain, Madhya Pradesh.

Siddha/Tamil ► Kurinji.

Folk ► Pandadi (Gujarat).

Action ► Pounded leaves—rubbed on body during the cold stage of intermittent fever.

Perilla frutescens (Linn.) Britton.

Family ► *Labiatae; Lamiacae.*

Habitat ► Throughout the Himalayas up to an altitude of about 3,500 m, and in the hills of Assam.

English ► Perilla, Wild Coleus.

P

Folk ► Bhanjeer, Ban-tulasi, Banjiraa, Bhasindi.

Action ► Herb—sedative, antispasmodic, antiasthmatic, resolvent.

P. frutescens var. *crispa* is used in mixtures prescribed for cough and lung affections.

Several chemotypes of Perilla have been detected. The Indian type is rich in rosefuran. Other components are perillene, perilla ketone, beta-caryophyllene, phellandrene and a few sesquiterpenoids. Aerial parts gave ethyl linolenate, linolenic acid and beta-sitosterol. The leaves also gave an anthocyanin, perillanin. The leaves and flowering tops yield essential oils containing perilla ketone as major component—94% in leaf oils and 47% in inflorescence oils at fruiting stage.

Perillaldehyde, a major component of the plant extract, inhibits (moderately) a broad range of both bacteria and fungi. The MeOH extract of var. *acuta* Kudo is reported to prolong hexobarbital-induced sleep in mice. Dillapiol has been isolated as the active principle from the methanolic extract.

Periploca aphylla Decne.

Family ► *Asclepiadaceae; Periplocaceae.*

Habitat ► Punjab and Rajasthan.

Folk ► Barri (Punjab).

Action ► Plant—stomachic; used in cerebral fever. Bark—purgative. Latex—used against tumours and swellings.

The leaves and stems contain 2.2% of resin alcohol, a bitter substance, tannin and small quantities of a glucosidal principle which produces first a decrease and then an increase in blood pressure. The bark contain 8% tannin.

Periploca calophylla Falc.

Family ► *Asclepiadaceae.*

Habitat ► The Himalayas, from Kashmir to Nepal and Meghalaya, ascending to 1,800 m.

Ayurvedic ► Krishna Saarivaa (substitute). (*Cryptolepis buchanani* is equated with Krishna Saarivaa.)

Action ► Used in place of *Cryptolepis buchanani* and *Hemidesmus indicus* for rheumatism, urinary and skin diseases.

The glycosides locin, plocin, plocinin, calocin, calocinin, as well as triterpenoids, have been reported from the twigs.

Peristrophe bicalyculata Nees.

Family ► *Acanthaceae.*

Habitat ► Distributed throughout India.

Ayurvedic ► Nadikaantaa, Praachibalaa, Sulomshaa, Kaakatikta, Kaakajanghaa. (Aatarilaal is a wrong synonym. It is equated with *Anthriscus cerefolium* Hoffm., used in Unani medicine.)

Siddha/Tamil ► Chebisa.

Folk ► Masi.

Action ► Plant—febrifuge. The essential oil shows tuberculostatic activity *in vitro*. It inhibits the growth of various strains of *Mycobaterium tuberculosis.*

Ayurvedic Pharmacopoeia of India recommends the dried root in insomnia and for fear-psychosis in children.

Dosage ► Root—1–5 g powder. (*API,* Vol III.)

Persea americana Mill.

Synonym ► *P. gratissima* Gaertn. f.

Family ► *Lauraceae.*

Habitat ► Native to Central America; introduced into India and grown for its fruit in Bangalore, Nandi Hills, Courtallam, Nagarcoil, Shevaroys, lower Palnis and the foothills of the Nilgiris; also in Pune.

English ► Avocado, Alligator Pear, Butter Fruit.

Action ► Fruit—hypocholesterolaemic. Leaf—bacteriostatic; potentially toxic to goats and sheep.

The fruit is highly nutritious. The fruit from Nilgiris contains 22.8% fat, 1.7% protein; also manganese, phosphorus, iron, potassium, vitamin E, vitamin C, beta-carotene, thiamine, riboflavin, nicotinic acid and foliate. It is relatively low in sodium and simple sugars.

American Avocado is rich in oil (15–30 g/100 g fresh fruit) that is mainly monounsaturated and a good source of linoleic acid. Its high fiber content might be responsible for its cholesterol lowering effects.

Preliminary evidence suggests that unsaponifiable fractions of Avocado and soybean oils (combination) can inhibit cartilage degradation and promote cartilage repair in osteoarthritic chondrocytes. (Properties of Avocado cited in *Natural Medicines Comprehensive Database,* 2007.)

Avocado oil is used in cosmetic preparations, soaps and pharmaceuticals. The peel of immature fruit contains antifungal compounds. The fruit pulp is used topically to promote hair growth.

Persea macrantha (Nees) Kosterm.

Synonym ► *Machilus macrantha* Nees.

Family ► *Lauraceae.*

Habitat ► Bihar and Peninsular India, up to 2,100 m.

English ► Machilus.

Action ► Bark—antiasthmatic, antirheumatic, purgative.

The root gave phytosterols, glycosides and alkaloids, the major one being machiline, shown to be identical with *dl*-coclaurine. Machiline exhibits hypotensive activity.

The leaves are used in external applications for ulcers.

Petiveria alliacea Linn.

Family ► *Phytolaccaceae.*

Habitat ► Native to America; introduced into India, grown in gardens.

Action ► Root—diuretic, antispasmodic, emmenagogue, abortifacient. Used for whooping cough, also for rheumatism and nervous diseases. (Long term use in high doses causes brain damage.)

Ethanolic extract of the leaves contains leridal, leridol, 5-O-methylleridol and 3-O-rhamnosides of dihydrokaempferol, dihydroquercetin and myricetin. The presence of high nitrate content in the plant has been reported and is considered a risk factor in humans.

Petroselinum crispum (Mill.) Airy-Shaw.

Synonym ► *Apium crispum* Mill.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to Europe, now cultivated throughout India.

English ► Parsley.

Unani ► Fitraasaaliyum, Karafs-e-Kohi.

Action ► Diuretic (used for bladder disorders, painful urination, retention of excess fluid in the tissues), antispasmodic, uterine tonic, emmenagogue, sedative (used for PMS and menopausal hot flushes, also in prostatitis), carminative, expectorant, aperient, antiseptic, anti-inflammatory.

Key application ► For flushing out the efferent urinary tract in disorders of the same and in prevention and treatment of kidney gravel. (*German Commission E.*) Contraindicated in kidney inflammations.

The British Herbal Compendium approves the internal use of the herb for flatulent dyspepsia, dysuria and rheumatic conditions.

The leaves and roots contain furocoumarins—psoralen, 5-and 8-methoxy psoralen, imperatorin, oxypeucedanin, iso-pimpinelin. Myristicin has been isolated from the leaf oil. The plant gave flavonoids—apiin, luteolin, apigenin-7-glucoside, luteolin-7-glucoside among others.

Myristicin showed high activity as an inducer of the detoxifying enzyme system, Glutathione S-transferase (GST) in the liver and small intestines of female mice (may be considered as a cancer chemoprotective agent).

The flavonoids, particularly apigenin, have been shown to be anti-inflammatory, to inhibit histamine release and to act as a free radical scavenger. Apiole, a constituent of the volatile oil, is reportedly antipyretic and phthalides of the root, seed and leaf are sedative in mice.

Both apiole and myristicin exhibit aquaretic and uterine stimulant activity, while sodium retention has been observed. (*Natural Medicines Comprehensive Database,* 2007.)

In homoeopathy, the herb is used for the treatment urinary disorders—sudden urge to urinate with severe pain, dribbling of urine after urination, gleet discharge and for amenorrhoea and neuralgic dysmenorrhoea.

P

Peucedanum grande C. B. Clarke.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Western Ghats and hills of Peninsular India.

Folk ► Baaphali (Gujarat), Duku.

Action ► Fruits—carminative, diuretic, stimulant. An infusion is used for gastric and intestinal troubles.

The seeds and roots gave imperatorin, byakangelicin and osthol. Seeds, in addition, gave phelopterin, columbianadin and byakangelicol.

Phaseolus aconitifolius Jacq.

Synonym ► *Vigna aconitifolia* (Jacq.) Marechal.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout India. Cultivated.

English ► Aconite-Bean, Moth.

Ayurvedic ► Makushtha, Moth.

Siddha/Tamil ► Tulukkapayir.

Action ► Seeds—used as a diet in fever; contains 24.4% protein. Root—narcotic.

Phaseolus adenanthus G. F. W. Mey.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout India, in the plains.

Ayurvedic ► Aranya-mudga. Mudgaparni (Kerala).

Siddha/Tamil ► Kattupayaru.

Action ► A decoction is used in bowel complaints and stricture. The roots are used to stop excessive salivation.

Phaseolus lunatus Linn.

Synonym ► *P. inamoenus* Linn.

Family ► *Fabaceae.*

Habitat ► Native to tropical America; cultivated throughout India.

English ► Double Bean, Lima Bean, Burma Bean.

Ayurvedic ► Shimbi.

Unani ► Lobiyaa, Sem.

Action ► Seeds—astringent. Used as a diet in fever. The shoots and pods from Manipur are reported to contain alkaloids, saponins and flavonoids.

Phaseolus mungo Linn. non-Roxb. & auct.

Synonym ► *Vigna mungo* (Linn.) Hepper.

Family ► *Papilionaceae; Fabaceae.*

English ► Kidney Bean, Black Gram.

Ayurvedic ► Maasha. (*P. sublobatus* Roxb. and *Teramnus labialis* Spreng. are equated with Maashaparni; dried aerial parts are used.) *Phaseolus dalzellii* Cooke and *P. sublobatus* Roxb. are known as *Maashaparni* in Kerala.

Unani ► Urd-Siyaah.

Siddha/Tamil ► Ulunthu.

Action ► Used as a pulse. In the form of a confection, used for leucorrhoea and seminal debility. Oil extracts of the pulse is used externally in rheumatism, contracted knee, stiff shoulder. Root—used as a poultice for inflammations and abscesses. Narcotic.

Teramnus labialis Spreng. (grows wild): The whole plant is used in rheumatism, paralysis, nervous diseases, haemoptysis and catarrh of respiratory tract.

Phaseolus radiatus
Linn. non-Roxb. & auct.

Synonym ► *Vigna radiata* (Linn.) Wilczek.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Extensively cultivated all over India.

English ► Greengram, Golden Gram.

Ayurvedic ► Mudga, Mungalya.

Unani ► Moong.

Siddha/Tamil ► Pattishai-payaru.

Action ► Used as a pulse. Soup is given as a diet to patients of enlarged liver and spleen, and after recovery from acute illness. A poultice of it is used for checking secretion of milk and reducing distention of the mammary glands.

Phaseolus trilobus
sensu Ait. & auct.

Synonym ► *Vigna trilobata* (Linn.) Verdcourt.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout India, up to an elevation of 2,100 m in the northeast.

English ► Wild Gram.

Ayurvedic ► Mudgaparni, Kaakaparni, Suuryaparni, Alpikaa, Sahaa, Kaakamudraa, Maarjaargandhikaa. (*P. adenanthus* G. F. W., and *Vigna pilosa* Baker are used as Mudgaparni in the South. Dried aerial parts, root and seed are used.)

Siddha/Tamil ► Kaatupayaru.

Folk ► Jangali Moong, Mugavan.

Action ► Whole plant—febrifuge. Leaves—sedative, cooling, antibilious. A decoction is used in intermittent fever. The plant contains friedelin, epifriedelin, stigmasterol and tannins. The bean contains methionine, tryptophan and tyrosine; also strepogenin, uridine, diphosphate-galacturonic acid. The seed protein contained lysine, valine, leucine and phenylalanine.

Dosage ► Seed—50–100 ml. decoction (*CCRAS.*); whole plant—3–5 g. (*API,* Vol. IV.)

Phaseolus vulgaris Linn.

Synonym ► *P. nanus* Linn.

Family ► Fabaceae.

P

English ▶ Kidney Bean, French Bean, Haricot Bean.

Unani ▶ Raajmah (seed), Lobia, Frashbean.

Action ▶ Bean—diuretic, hypotensive, resolvent, regulates blood sugar. Used for water retention; albuminuria, especially of pregnancy; premenstrual tension.

Key application ▶ Seed-free pods—in supportive treatment for inability to urinate. (*German Commission E.*)

The seeds of French Bean contain triterpenoid glucosides and soyasaponin V.

Raajmah consumption by diabetic patients is reported to produce highly significant reduction in their blood glucose level and glycaemic index, as compared to wheat and rice consumption.

Raw bean contains lectins which are destroyed when cooked. Its hypoglycaemic activity is most likely due to its chromium, trigonelline and fiber content. (Sharon M. Herr.)

Phlogacanthus thyrsiflorus Nees.

Family ▶ *Acanthaceae.*

Habitat ▶ The sub-tropical Himalayas, Upper Gangetic Plain, Bihar, North Bengal and Assam.

Folk ▶ Dieng-soh kajut (Meghalaya), Chuhai (Bihar), Titaaphul (Assam).

Action ▶ Whole plant—used like *Adhatoda vasica* in whooping cough and menorrhagia. Fruits and leaves—burnt and prescribed for fevers. The leaves are reported to contain diterpene lactone, phlogantholide A and its glucoside.

A related species, *P. jenkinsii* C. B. Clarke, found in Assam, is also known as Titaaphul. A decoction of leaves is given for diseases of spleen and liver and for fevers.

Phoenix dactylifera Linn.

Family ▶ *Palmae; Arecaceae.*

Habitat ▶ Cultivated in Punjab and Rajasthan.

English ▶ Date Palm.

Ayurvedic ▶ Kharjuura, Kharjuuraka, Kharjuurikaa. Pindakharjuurikaa. Chhuhaaraa (dry date). Pindakharjuura is the fruit of *Phoenix acaulis* Roxb.

Unani ▶ Khurmaa, Khajuur, Chhuharaa.

Siddha/Tamil ▶ Perichchankay, Ita.

Action ▶ Fruit pulp—antitussive, expectorant, demulcent, laxative, diuretic, restorative. Sap—cooling, laxative. Gum—used in diarrhoea and genitourinary diseases.

The fruit contains ascorbic acid (vitamin C), carotene (as vitamin A), nicotinic acid, riboflavin, thiamine, sugars (60–80%). Besides sucrose and invert sugars, rhamnose, xylose, arabinose, ribose, galactose and galacturonic acid have been identified in the fruit. Invert sugar predominates in the soft dates; sucrose in dry varieties. The dried date, used in Ayurvedic

and Unani compositions, contains protein 2.5–3, fat 0.5, carbohydrates 75.8–82.9% and calcium 35.9, phosphorus 129.3 and iron 3.4 mg/100 g.

Presence of sterols of ergosterol group, and esterone has been reported from dried date seeds.

Charged C-glycosylflavones and caffeylshikimic acid, leucocyanidin are characteristically present in the plant. Flavonol glycosides are also common. Several uncharged C-glycosylflavones were also detected.

Dosage ► Fresh fruit—10–50 g, dried fruit—10–15 g. (*API,* Vol. IV.)

Phoenix paludosa Roxb.

Family ► *Palmae.*

Habitat ► Coastal swamps of West Bengal (particularly Sundarbans), Orissa and the Andamans.

Ayurvedic ► Hintala.

Folk ► Hital (Orissa), Hintalamu (Telugu).

Action ► Fruits—antiphlogistic, cooling; used in flatulence.

Triacontanol, beta-sitosterol have been isolated from the plant.

Phoenix pusilla Gaertn.

Family ► *Palmae; Arecaceae.*

Habitat ► Coromandel Coast.

Ayurvedic ► Parushaka (Kerala). (*Grewia asiatica* Linn., *Tiliaceae,* is also equated with Parushaka.)

Siddha/Tamil ► Kalangu, Ithi, Sagi.

Action ► Fruit—cooling, laxative. Used in respiratory disorders. Gum—used in diarrhoea and genitourinary diseases. Fresh sap—laxative.

Phoenix sylvestris Roxb.

Family ► *Palmae; Arecaceae.*

Habitat ► Andhra Pradesh, Karnataka and Madhya Pradesh.

English ► Wild Date Palm.

Ayurvedic ► Kharjuuri.

Siddha/Tamil ► Periyaitcham, Icham.

Folk ► Sulemaani Khajuur, Desi Khajuur.

Action ► Fruits—restorative. Juice—cooling, gastric stimulant. Seeds—used in ague. Root—used for nervous debility.

Fresh, unfermented sap (Niraa) is a good source of ascorbic acid, nicotinic and isonicotinic acids, riboflavin, thiamine, sugars; crystine, leucine, isoleucine, lysine, phenylalanine, threonine, tyrosine.

The concentration of amino acids is much higher in palm jaggery than in sugar cane jaggery.

Fresh fruits contain protein 1.2, fat 0.4, calcium 0.022 and phosphorus 0.38%.

Dosage ► Fruit—10–20 g paste. (*CCRAS.*)

Pholidota articulata Lindl.

Family ► *Orchidaceae.*

Ayurvedic ► Jivanti (substitute). (*Dendrobium macraei* Lindl. is also used as a substitute for Jivanti. Jivanti is equated with *Leptadenia reticulata* W. & A.)

Action ► Age-sustaining tonic, restorative.

Phragmites communis Trin.

Family ► *Gramineae; Poaceae.*

Habitat ► The Himalayas, from Kashmir to Kumaon up to an altitude of 4,000 m.

English ► Common Reed.

Folk ► Dila, Dambu (Punjab).

Action ► Rhizomes and roots—diuretic, emmenagogue, diaphoretic, hypoglycaemic, antiemetic.

P

The rhizomes are rich in carbohydrates; contain nitrogenous substances 5.2, fat 0.9, N-free extr. 50.8, crude fibre 32.0, sucrose 5.1, reducing sugars 1.1, and ash (rich in silica) 5.8%; asparagine 0.1% is also present. Leaves possess a high ascorbic acid content (200 mg/100 g).Nodes and sheaths yield 6.6% and the underground parts over 13% of furfural.

The root of common Reed is prescribed in Chinese traditional medicine as an antipyretic against influenza and fevers. Presence of polyols, betaines and free poline has been reported in the methanolic extract. The extract is reported to show bactericidal activity. The root gave a polysaccharide which contains sugars, arabinose, xylose and glucose in a molar ratio of 10:19:94; some of the fractions showed immunological activity.

Phragmites karka Trin. ex Steud.

Synonym ► *P. roxburghii* (Kunth) Steud.
P. maxima Blatter & McCann in part.

Family ► *Gramineae; Poaceae.*

Habitat ► Throughout India, in marshy places.

English ► Common Reed-grass.

Ayurvedic ► Nala. (*Arundo donax* Linn. is also equated with Nala.)

Siddha/Tamil ► Perunanal.

Folk ► Narakul.

Action ► Stem and rhizome—diuretic, diaphoretic. Used topically to relieve insect bite.

P. karka is not discriminated from *P. communis* for medicinal uses in Indian medicine.

Phyla nodiflora (L.) E. Greene.

Synonym ► *Lippia nodiflora* A. Rich.

Family ► *Verbenaceae.*

Habitat ► Throughout India, near fresh water bodies.

English ► Jalapippali, Shaaradi, Shakulaadani, Matsyagandhaa, Matsyaadani, Laangali, Vashiraa.

Siddha/Tamil ► Poduthalai.

Action ► Spasmolytic, diuretic, febrifuge.

The plant contains flavone glycosides—nodiflorins A and B, lipiflorins A and B, as well as free flavones including 6-hydroxyluteolin, nepetin and nodifloretin along with beta-sitosterol and stigmasterol glucosides.

Dosage ► Plant—10–20 ml. juice. (*CCRAS.*)

Phyllanthus amarus Schum. & Thonn. Phyllanthus fraternus Webster.

Family ► *Euphorbiaceae.*

Habitat ► Throughout the hotter parts of India, particularly on cultivated land, up to 1,000 m.

Ayurvedic ► Bhuumyaamalaki, Bahupatri, Bhuudhaatri, Bahuphalaa, Taamalaki.

Unani ► Bhui Aaamalaa.

Siddha/Tamil ► Keelkaay Nelli.

Action ► Plant—diuretic, deobstruent, astringent, anti-inflammatory, styptic. Used as a single drug in the treatment of jaundice. Used in prescriptions for dyspepsia, indigestion, chronic dysentery, urinary tract diseases, diabetes, skin eruptions.

The leaves yielded lignans—phyllanthin (bitter), hypophyllanthin (non-bitter); niranthin, nirtetralin and phyltetralin. The whole plant gave a number of flavonoids, including quercetin, quercitrin, astragalin, rutin, kaempferol. Isolation of a hydrolysable tannins, amarulone, is reported from the plant.

The plant is reported to show antiviral activity against hepatitis B virus and related *hepadna* virus. It was also found to effectively repair CCl4-induced liver damage in rats.

The herb exhibited hypotensive and hypoglycaemic activity. (*Indian J Exp Biol* 1995, 33 (11) 861–864.)

Phyllanthus fraternus Webster: The ethanolic extract of the plant exhibited hepatotoxic-protective activity in albino rats pretreated with CCl-4, The petroleum extract is reported to possess analgesic and anti-inflammatory properties. The flavonoids, isolated from the ethanolic extract of the plant, exhibit hypoglycaemic activity in alloxan-treated albino rats. The ethanolic and aqueous extracts of the plant exhibit antibacterial and antifungal activity.

Dosage ► Root, stem, leaf—3–6. powder. (*API,* Vol. I and III.)

Phyllanthus distichus Muell.-Arg.

Synonym ► *P. acidus* Skeels. *Cicca acida* (Linn.) Merrill.

Family ► *Euphorbiaceae.*

Habitat ► Indian gardens.

English ► Country Gooseberry.

Ayurvedic ► Lavali-phala, Lowani Hariphala.

Siddha/Tamil ► Aranelli.

Action ► Fruit—astringent, tonic to liver; improves appetite, useful in biliousness, constipation, vomiting, bronchitis. Roots and seed—cathartic. The juice of the root

bark produces headache and severe abdominal pain.

The root bark contains 18% tannin, saponin, gallic acid and a crystalline substance (probably lupeol). The bark contains beta-amyrin and phyllanthol.

The fruit is sour; contains acidity (as acetic acid) 1.70%.

Phyllanthus maderaspatensis Linn.

Family ► *Euphorbiaceae.*

Habitat ► Throughout drier parts of India.

Unani ► Kanochaa, Isfahaan Marv.

Siddha/Tamil ► Mela-nelli.

Action ► Leaves—an infusion is used in headache. Seeds—carminative, diuretic.

Whole plant revealed antispasmodic action in isolated guinea-pig ileum, CNS depressant and hypothermic effects in mice.

P

Phyllanthus niruri Linn.

Family ► *Euphorbiaceae.*

Habitat ► Native to America.

English ► Chanca Piedra.

Ayurvedic ► Bhuumyaamalaki, assigned to *P. niruri,* has now been equated with *P. fraternus.*

Action ► Antispasmodic, antipyretic, diuretic, antiviral, bactericidal.

Taking Chanca Piedra orally does not seem to be effective for treating hepatitis B. The herb contains niuride, which inhibits specific HIV-protein binding activity, but does not protect cells from acute HIV infection. (*Natural Medicines Comprehensive Database,* 2007.)

Phyllanthus simplex Retz.

Synonym ► *P. virgatus* J. R. et G. Forst.

Family ► *Euphorbiaceae.*

Habitat ► Throughout India.

Ayurvedic ► Bhumyaamalaki (var.).

Folk ► Mothi-bhuiaamvali (Maharashtra).

Plant—antiseptic. Fresh leaves, bruised in butter milk, are used as a wash for itch. Fresh leaves, flowers and fruits with cumin seeds and sugar, are used in gonorrhoea. Root—applied to mammary abscesses.

Fruits contain oxalic acid.

Phyllanthus urinaria Linn.

Family ► *Euphorbiaceae.*

Habitat ► Throughout the plains of India from Punjab to Assam and Southward to Kerala up to 1,000 m.

Ayurvedic ► Bhuumyaamataki (var.), Taamravalli.

Siddha/Tamil ► Senkeezhnelli.

Folk ► Laal-bhui-aamlaa, Hazaarmani.

Action ► See *P. amarus.*

The leaf and stem gave flavonoids—quercetin, astragalin, quercitrin, isoquercitrin and rutin; Me-brevifolin-carboxylate and tri-dehydrochebulic acid.

Physalis alkekengi Linn.

Family ► *Solanaceae.*

Habitat ► Native to South-east Europe and Japan; naturalized in many parts of the world; grown in Indian gardens.

English ► Strawberry Tomato, Winter Cherry. (*Withania somnifera* is also known as Winter Cherry.)

Ayurvedic ► Raajaputrikaa.

Unani ► Kaaknaj.

Action ► Berries—diuretic, antitussive, oxytocic, analgesic, febrifuge; used for urinary disorders, suppression of urine, gout and intermittent fevers.

Berries contain flavonoids, including luteolin-7-glucoside and withasteroids.

Physalis angulata Linn.

Family ► *Solanaceae.*

Habitat ► Native to tropical America; cultivated in Indian gardens in Uttar Pradesh and Tamil Nadu; also grows in moist places as a weed.

Action ► Plant—diuretic.

Aerial parts yielded seco-withanolides—cleaved steroidal constituents containing physalins. In Taiwan, physalin B and F have been isolated from the ethanolic extract of the whole plant. Both physalin B and F are reported to inhibit the growth of several human leukaemia cell systems.

Physalis minima Linn.

Family ► *Solanaceae.*

Habitat ► Throughout India, ascending up to 2,300 m.

English ► Sun-berry.

Ayurvedic ► Tankaari, Parpotikaa, Chirapotikaa.

Siddha/Tamil ► Sodakku thakkali.

Action ► Berries—diuretic, aperient, alterative. Used for gout and urinary diseases.

Quercetin 3-O-galactoside, isolated from the crude extract of the leaves, is reported to exhibit anti-inflammatory activity comparable to phenylbutazone in carageenan-induced rat paw oedema.

Physalis minima Linn. var *indica* C. B. Clarke is common weed in irrigated fields and bunds.

The plant contains withasteroids, physalindicanols, withaminimin and withaphysalin, 3-O-glucosides of kaempferol and quercetin, in addition to beta-sitosterol and its glucoside.

The diuretic action of *Physalis minima* leaves is attributed to the high content of potassium nitrate (8–10%).

Physalis peruviana Linn.

Family ► *Solanaceae.*

Habitat ► Native to tropical America; grown in the hills and plains throughout India.

English ► Cape Gooseberry.

Ayurvedic ► Parpoti (var.).

Siddha/Tamil ► Perungunni, Pottipallam.

Folk ► Rasbhari, Mako.

Action ► Plant—diuretic. Leaf—anthelmintic, an infusion is used in abdominal disorders. Fruits—a good source of carotene and ascorbic acid; eaten as a table fruit.

The fruit contain carotene (as vitamin A) 2,380 IU, thiamine 0.05, riboflavin 0.02, nicotinic acid 0.3 and ascorbic acid 49 mg/100 g; mineral matter 0.8%; phytin phosphorus 18, iron 2.0, ionizable iron 0.9, sodium 0.9, potassium 320, copper 0.19, and sulphur 43 mg/100 g. The juice from the ripe fruits contain considerable quantity of pectin. The chief acid is citric acid, but malic and tartaric acids are also present.

The plant is a source of highly oxygenated ergostane-type of steroids—withanolides and related compounds.

P

Physochlaina praealta Miers.

Family ► *Solanaceae.*

Habitat ► Lahul valley (Punjab), Ladakh, North Kashmir. Western Tibbet at altitudes of 3,300–4,600 m.

Folk ► Daturaa (Ladakh), Laangtaan; Sholar, Bajarbang (Punjab).

Action ► Leaves—poisonous and narcotic.

The roots of the plant contain 0.64% alkaloids (calculated as hyoscyamine). The plant constitutes an excellent source of atropine.

Picea smithiana Boiss.

Synonym ► *P. morinda* Link.
Abies smithiana Lindl.

Family ► *Pinaceae.*

Habitat ► The Himalayas from Kashmir to Kumaon at altitudes of 1,500–3,500 m.

English ► West Himalayan Spruce.

Folk ► Roi, Rhai, Raghaa, Kathela, Kandre, Morindaa. Spruce (trade).

Action ► Essential oil—antiseptic. Used in bath salts, room sprays and deodorants.

Key applications ► Fir Needle Oil, obtained from Picea abies, synonym P. excelsa)—externally and internally, for catarrhal illness of the upper and lower respiratory tract; externally, for rheumatic and neuralgic pains. (*German Commission E.*)

The oil contains alpha-pinene, *l*-alpha-phellandrene, dipentene, bornylacetate, cadinene, S-guaiazulene and a bicyclic sesquiterpene. The oil distilled from the leaves collected in Gulmarg had a ester content of 23.2% (as bornyl acetate). The bark contained 4.22% tannin.

Picea abies has been introduced at Manali (at 1,890 m). It yields an oleoresin which is used in plasters and ointments. The essential oil is used in

perfumes and cosmetics. The needles yielded dilignol glycosides.

Picrasma quassioides Bennett.

Family ► *Simaroubaceae.*

Habitat ► Garhwal, Himachal Pradesh and Kulu.

English ► Quassia (substitute for *P. excelsa* Lindtl).

Ayurvedic ► Bhurangi, Nimbi. (*Clerodendrum serratum* and its related species represent Bhaargi or Bhaarangi.)

Folk ► Nimatotaa.

Action ► Wood—a non-astringent bitter tonic and stomachic, amoebicidal, anthelmintic (used as enema), insect repellent. Used as a supporting medicine for temporary relief in cirrhosis of liver.

Many indole alkaloids of beta-carboline, canthin-6-one and beta-carboline dimer type, have been isolated from the wood. These are reported to increase the blood flow rate in the intestine and stomach of rabbit; also exhibited antiviral activity on Herpes simplex virus.

Nigaki lactone and methylnigakinone, isolated from the wood, showed antigastric ulcer activity in rats. The extract of the wood is reported to prevent the secretion of gastric juice in a dose-dependent manner in rats. The extract also showed the same effects on rats having aspirin-induced gastric ulcer.

Picrorhiza kurroa Royle ex Benth.

Family ► *Scrophulariaceae.*

Habitat ► The alpine Himalayas from Kashmir to Sikkim.

English ► Picrorhiza.

Ayurvedic ► Katukaa, Katurohini, Kattarohini, Katuki, Katukikaa, Krishnabhedaa, Kaandaruhaa, Matsyashakalaa, Chakraangi, Shatparvaa, Arishta, Ashokarohinya, Shakuldaani.

Unani ► Kutki, Kharbaq-e-Hindi.

Siddha/Tamil ► Kaduguragini.

Action ► Root—stomachic, antidiarrhoeal, cholagogue, hepatoprotective. Used in hepatitis, chronic dysentery, amoebiasis.

Key application ► In jaundice, intermittent fever, dyspnoea and skin diseases. (*The Ayurvedic Pharmacopoeia of India.*)

The roots yield a glycosidal bitter principle, kutkin, found to be a mixture of two iridoid glycosides, picroside I and kutkoside. Also obtained were D-mannitol, kutkiol, kutkisterol and a ketone (identical with apocynin).

Kutkin exhibited hepatoprotective activity in CCl4-induced toxic rats.

Picroliv, a standardized fraction from the alcoholic extract of the root and rhizome, containing 55–60% of a mixture of picroside I and kutkoside (1:15) showed dose-dependent protective activity on isolated hepatocytes *in vitro* against thiocetamide-induced hepatic damage in rat and was found to be more potent than Silymarin,

P

a known hepatoprotective agent. Picroliv is reported to show protective effect against rifampicin-induced hepatotoxicity in rats. It also exerts hypolipidaemic effect in normal, triton-treated and cholesterol-fed rats.

Kutkin, picroside I and kutkoside exhibit anti-inflammatory property.

The phenolic glycoside, androsin, isolated from the plant, prevents allergen and platelet activating factor-induced bronchial obstruction in guinea-pigs *in vitro*.

Cucurbitacin glycosides, isolated from the root, exhibit liver protective, tumour inhibitory and anti-inflammatory activity.

Dosage ► Root—1–3 g; 3–6 g as purgative. (*CCRAS.*)

Picrorhiza scrophulariaeflora Pennell.

Family ► *Scrophulariaceae.*

Habitat ► Eastern Himalayan in Nepal and Sikkim.

Action ► Properties similar to those of *Picrorhiza kurroa.*

The root contains the iridoid glycosides, amphicoside, catalpol, aucubin and androsin; also cucurbitacin glycosides.

Pilocarpus microphyllus Stapf.

Family ► *Rutaceae.*

Habitat ► Native to tropical America; cultivated in Indian gardens.

English ► Jaborandi.

Action ► Stimulant (excites most glands), expectorant, powerful diaphoretic. Used in hair tonics to stimulate hair growth. (Irritates stomach and causes vomiting in overdose.)

The leaf contains a parasympathetic stimulant pilocarpine (0.5%). It is an obsolete medicinal herb, but is used in the production of pilocarpine. (*Natural Medicines Comprehensive Database,* 2007.)

Pimenta dioica (Linn.) Merrill.

Synonym ► *P. officinalis* Lindl.

Family ► *Myrtaceae.*

Habitat ► Native to West Indies and tropical America; grown in Indian gardens; in Bengal, Bihar, Orissa and Bangalore.

English ► Allspice tree, Jamaica Pepper tree, Pimento tree.

Action ► Berry oil and leaf oil—carminative and stimulant. The oil contains chiefly eugenol (65–80%), responsible for the herb's effect on the digestive system and its pain relief properties; also for anaesthetic effect when crushed berries are applied topically.

Pimpinella anisum Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Native to the Mediterranean region; cultivated in Uttar Pradesh., Punjab, Assam and Orissa.

English ► Anise, Aniseed.

Unani ► Anisoon, Baadiyaan-roomi.

Action ► Carminative, diuretic, anticholerin, antispasmodic, expectorant. Used for flatulence, dry coughs, whooping cough, bronchitis.

Key application ► Internally in dyspeptic complaints; internally and externally in catarrhs of the respiratory tract. (*German Commission E, ESCOP, WHO, The British Herbal Pharmacopoeia.*)

The fruit gave volatile oil consisting mainly of *trans*-anethole (70–90%), with estragole, anise ketone, anisic acid, beta-caryophyllene, anisaldehyde, linalool. The fruit contained traces of furocoumarins; seeds gave benzoic acid, caffeic acid, containing protein and myristicin. Roots afforded sterols, coumarins and flavone glycosides. Aniseed has been demonstrated to increase the mucociliary transport *in vitro* and to significantly increase liver-regeneration in rats.

Aniseed is also used as a galactagogue. This property is thought due to the presence of polymers of anethole, dianethole and photoanethole.

Aqueous extract of roasted aniseed is reported to show cholinomimetic effect on rat blood pressure, rat jejunum and frog rectus abdominis preparations.

Alcoholic extract of aniseeds possesses antimicrobial and fungicidal activity.

Anethole has a structure similar to catecholamines including adrenaline, noradrenaline and dopamine and to the hallucinogenic compound myristicin as well. (*Natural Medicines Comprehensive Database,* 2007.)

Pimpinella saxifraga Linn. var. **dissectifolia** C. B. Clarke, non-Boiss.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Kashmir at 3,900 m.

English ► Burnet Saxifrage, Pimpinella Root.

Action ► Root—carminative, stimulant, expectorant, cholagogue, diuretic, emmenagogue. Used for diarrhoea.

Key application ► Rhizome—in catarrhs of the upper respiratory tract. (*German Commission E.* Above ground parts have been included among unapproved herbs.)

The main components of the fruits and roots are isoeugenol epoxy tiglic ester, isoeugenol epoxy-2-methylbutanoic ester and 4-phenyl tiglic ester. Roots also contain pimpinellin and isopimpinellin.

Pinus excelsa Wall. ex D. Don.

Synonym ► *P. wallichiana* A. B. Jackson.

Family ► *Pinaceae.*

Habitat ► Himalayas from Kashmir to Bhutan at 1,800–3,700 m, also Assam.

English ► Indian Blue Pine, Bhutan Pine, Five-leaved Pine.

Ayurvedic ▶ Sarala (var.).

Folk ▶ Chillaa.

Action ▶ Uses similar to *Pinus roxburghii.*

The essential oil contains alpha-and beta-pinene as major constituents.

Pinus gerardiana Wall.

Family ▶ *Pinaceae.*

Habitat ▶ Northwest Himalayas from Garhwal eastwards at altitudes of 1,800–3,000 m.

English ▶ Neosia Pine, Edible Pine, Chilgoza Pine.

Ayurvedic ▶ Nikochaka.

Unani ▶ Chilgozaa.

Action ▶ Kernels—stimulant, carminative, expectorant. Oil from seeds—externally used for wounds and ulcers.

The kernels gave protein 15.9, fat 49.9, carbohydrates 21.6 and mineral matter 2.9%. The mineral constituents include calcium 90.8, phosphorus 92.4 and iron 2.4 mg/100 g. Pectin is present to the extent of 1.73% (calculated as calcium pectate). Seed protein on hydrolysis gave amino acids—leucine, isoleucine, valine, lysine, phenylalanine, tryptophan and methionine. The oil gave glycerides. The essential oil from oleoresin contains alpha-and beta-pinene as major constituents; other constituents are sesquiterpenes.

Pinus khasya Royle.

Synonym ▶ *P. insularis* Endl.

Family ▶ *Pinaceae.*

Habitat ▶ Assam; introduced into hills of North Bengal.

English ▶ Khasi Pine.

Ayurvedic ▶ Sarala var.

Folk ▶ Digsaa (Khasia).

Action ▶ Spasmolytic, antimicrobial. Oleo-resin—considered superior to that of *P. roxburghii* for turpentine. The bark contains 7–10% of tannin.

The essential oil from oleoresin contains chiefly alpha-pinene. Other constituents are beta-pinene, longifoline and sesquiterpenes. Abetic acid from rosin possesses weak cardiac and spasmolytic activities.

Pinus roxburghii Sarg.

Synonym ▶ *P. longifolia* Roxb.

Family ▶ *Pinaceae.*

Habitat ▶ The Western and Eastern Himalayas.

English ▶ Long-leaved Pine, Three-leaved Pine, Chir Pine.

Ayurvedic ▶ Sarala, Pita-vriksha, Surabhidaaruka, Dhuupavriksha, Namasu. Oleo-resin—Shriveshtaka, Ghandh-Birojaa.

Unani ▶ Sanobar-ul-Hindi. Oleo-resin—Gandh-Bihrojaa, Qinn, Berzad.

Siddha/Tamil ▶ Simaidevadaru.

Action ▶ Needle, needle oil—decongestant, expectorant, antiseptic. Oil—used in cough and cold remedies, particularly inhalations

and in rubefacients for rheumatism and muscle stiffness. Resin—expectorant, antiseptic, antipruritic.

The essential oil from oleoresin contains chiefly alpha-and beta-pinene; carene and longifoline.

Pinus pinaster Ait (Cluster Pine, Maritime Pine) has been successfully grown in Kulu, Manali and Rahini. *German Commission E* recognized the efficacy of the needle-oil in catarrhal diseases of the upper and lower respiratory tract (internally, as well as externally).

Dosage ▶ Heartwood, root—1–3 g powder. (*API,* Vol. III.)

Pinus succinifera (Goppert) Cornw.

Family ▶ *Pinaceae.*

Habitat ▶ Native of northern scandinavia.

English ▶ Baltic Amber, Succinite.

Unani ▶ Ambar, Kahruubaa,

Action ▶ Cardiac tonic, styptic. *Vateria indica* is used in Unani medicine as a substitute for *P. succinifera* gum-resin (Fossil-resin).

Piper attenuatum Buch.-Ham. ex Miq.

Synonym ▶ *P. bantamense* Blume.

Family ▶ *Piperaceae.*

Habitat ▶ Eastern tropical Himalayas, Assam, Khasi Hills and the Nilgiris.

Siddha/Tamil ▶ Kattumilaaku.

Action ▶ Root—diuretic. Plant—rubefacient; used for muscular pains and headache.

Several aristolactams have been reported from the aerial parts of the plant. Crotepoxide exhibited significant antitumour activity.

Roots contain alkamides including piperine, piperlonguminine and guineensine.

Piper betle Linn.

Family ▶ *Piperaceae.*

Habitat ▶ Cultivated in warmer and damper parts of India; Assam, West Bengal, Bihar, Uttar Pradesh, Karnataka, Kerala.

English ▶ Betel pepper.

Ayurvedic ▶ Taambula, Naagvallari, Naagini, Taambulvalli, Saptashiraa, Bhujangalataa.

Unani ▶ Paan, Tambool.

Siddha/Tamil ▶ Vetrilai Nagavalli, Kammaaruvetritai.

Action ▶ Leaf—stimulant, carminative, astringent, antiseptic. Essential oil from leaves—antispasmodic, antiseptic. Used in respiratory catarrhs. Fruit—bechic.

The leaves afforded beta- and gamma-sitosterol, hentriacontane, pentatriacontane, *n*-triacontanol, stearic acid and chavicol. The essential oil from leaves contained carvacrol, eugenol, chavicol, allyl catechol, cineole, estragol, caryophyllene, cardinene, *p*-cymene and eugenol methyl ether.

Administration of the leaf extract resulted in decreased tumour burden and tumour incidence and a delay in the onset of mammary tumour in Wistar rats.

The alcoholic extract of the leaf stalk is reported to show antispermatogenic and antiandrogenic effect in male albino rats.

The essential oil exhibited hypotensive, cardiac as well as respiratory depressant and cardiotonic properties.

The leaf showed antifungal and antibacterial activity. The antiseptic activity is attributed to chavicol.

Dosage ► Leaf—10–15 ml juice. (*API*, Vol. III.)

Piper chaba Hunter non-Blume.

Synonym ► *P. retrofractum* Vahl. *P. officinarum* DC.

Family ► *Piperaceae.*

Habitat ► Native to Moluccas, cultivated in Indonesia, also in India.

English ► Java Long Pepper.

Ayurvedic ► Gajapippali (spikes of Scindapsis officinalis, Araceae, are also known as Gajapippali), Chavya, Chavika.

Siddha/Tamil ► Chevuyam.

Action ► Similar to *P. longum* and *P. nigrum*. Fruits—stimulant, carminative; used in haemorrhoidal affections; as a tonic, after-childbirth. Roots—chewed or brewed in decoction for colic, dyspepsia and gastralgia.

Key application ► In diseases of the spleen, chlorosis, diseases of the abdomen. colic, worm infestation. (*The Ayurvedic Pharmacopoeia of India.*)

Java long pepper is similar in composition to black pepper; it contains less piperine and volatile oil (piperine 4.5 and volatile oil 1.5%).

The stem is used as a substitute for *Piper longum* root. It contains the alkaloids piperine and piplartine. Beta-sitosterol, glycosides, glucose and fructose and mucilage have also been reported. Active principles show muscle relaxant property.

Piper cubeba Linn. f.

Family ► *Piperaceae.*

Habitat ► Native to Indonesia; cultivated in Assam and Karnataka.

English ► Cubeb, Tailed Pepper.

Ayurvedic ► Kankola, Kakkola, Kankolaka, Takkola, Koraka, Kolaka, Kashphala, Sheetalchini, Chinoshana.

Unani ► Kabaabchini, Habb-ul-uruus.

Siddha/Tamil ► Valmilagu.

Action ► Fruit—Carminative, diuretic, expectorant. Used for coughs, bronchitis, asthma, urinary tract infections, amoebic dysentery. Stimulates genitourinary mucous surfaces. Oil—antibacterial, used in genitourinary diseases and cystitis.

Key application ► In dysuria. (*The Ayurvedic Pharmacopoeia of India.*)

The ground fruits have been found to be effective in treating amoebic dystentery.

The oil exhibits antiviral activity in rats and antibacterial *in vitro*.

Unripe fruit contains volatile oil (10–20%) consisting of sesquiterpene hydrocarbons; lignans, mainly cubebine (about 2%), with (–)-cubebinin and kinokinin; cubebic acid. The oxygenated cyclohexanes, piperenol A and B, together with (+)-crotepoxide and (+)-zeylenol, have been isolated from the fruit. Polyhydroxy cyclohexanes possess antitumour, antileukaemic and antibiotic activities.

Dosage ▶ Fruit—1–2 g powder. (*API,* Vol. I.)

Piper hamiltonii C. DC.

Family ▶ *Piperaceae.*

Habitat ▶ Sikkim, Terai, West Bengal and Khasi hills, up to 900 m.

English ▶ Wild Pepper.

Folk ▶ Jangali Paan.

Action ▶ Carminative and diuretic.

Kadsurin A and isodihydrofutoquinol B have been isolated from aerial parts.

Piper longum Linn.

Family ▶ *Piperaceae.*

Habitat ▶ Warmer parts of India, from Central Himalayas to Assam, lower hills of West Bengal; Uttar Pradesh, Andhra Pradesh, Western Ghats from Konkan southwards to Trivandrum. Often cultivated.

English ▶ Indian Long Pepper, Joborandi.

Ayurvedic ▶ Pippali, Maagadhi, Maagadha, Maagadhaa, Maagadhikaa, Magadhodbhavaa, Vaidehi, Upkulyaa, Pippalikam, Chapalaa, Kanaa, Krishnaa. Uushnaa, Shaundi, Kolaa, Tikshna-tandulaa.

Unani ▶ Filfil Daraaz, Daarfilfil.

Siddha/Tamil ▶ Thippili, Arisi thippili. Thippiliver (root).

Action ▶ Fruits—used for diseases of the respiratory tract (cough, bronchitis, asthma); as sedative (in insomnia and epilepsy); as cholagogue (in obstruction of bile duct and bladder), as emmenagogue, as digestive, appetizer and carminative (in indigestion); as general tonic and haematinic (in anaemia, chronic fevers and for improving intellect). Applied locally on muscular pains and inflammations.

Several aristolactams and dioxoaporphines have been isolated from Indian long pepper. It also contains the long chain isobutyl amide, longamide, besides guineensine and the lignans, pluviatilol, methyl pluviatilol (fargesin), sesamin and asarinine.

Piperine is the major alkaloid of peppers.

Piperine is antipyretic, hypotensive, analeptic, CNS stimulant. It has been reported to exert significant protection against CCl4-induced hepatotoxicity in mice. It improves drug availability in experimental animals, and is

used for enhancing the efficacy of co-administered medicaments.

Piperine enhanced bioavailability of hexobarbital, phenytoin, propranolol and theophylline. (Sharon M. Herr.) (Piperine is also a component of Piper nigrum.)

N-isobutyl-deca-trans-2-trans-4-dienamide, isolated from the fruit, exhibited antitubercular property.

Milk extract of the fruit effectively reduced passive cutaneous anaphylaxis in rats. It protected guinea-pigs against antigen-induced bronchospasm.

In China, Piper longum oil constituents were reported to inhibit the increase in serum total cholesterol induced by triton in mice.

The root powder exhibited antifertility activity.

A related species, *P. peepuloides* Roxb., is known as Saamvali Peepal. It is used specifically against obstinate skin diseases and as a sialagogue.

Dosage ► Fruit—1–3 mg (*API,* Vol. IV); root—1–3 g powder. (*CCRAS.*)

Piper nigrum Linn.

Family ► *Piperaceae.*

Habitat ► Native of the Indo-Malaysian region; cultivated in Western Ghats, Karnataka, Maharashtra, Assam and Kerala.

English ► Black Pepper.

Ayurvedic ► Maricha, Vellaja, Uushna, Suvrrita, Krishnaa.

Unani ► Filfil Siyaah, Safed.

Siddha/Tamil ► Milagu. Milaguver (root).

Action ► Stimulant, carminative, diuretic, anticholerin, sialagogue, bechic, antiasthmatic. Used in fevers, dyspepsia, flatulence, indigestion, and as mucous membrane and gastro-intestinal stimulant. Externally—rubefacient and stimulant to the skin. Used as a gargle for sore throat. Used with ginger and Piper longum for viral hepatitis.

The fruit yielded piperine, piperatine and piperidine; amides, piperyline, piperoleins A and B, and N-*iso*-butyl-cicosa-*trans*-2-*trans*-4-dienamide.

The aqueous extract of roasted black pepper is reported to show cholinomimetic effect on rat abdominis muscles.

Dosage ► Fruit—500 mg to 1 g. (*CCRAS.*)

Piper schmidtii Hook. f.

Family ► *Piperaceae.*

Habitat ► Assam, Western Ghats, the Nilgiris and Palni hills above 1,500 m.

English ► Nilgiri Pepper.

Action ► Carminative.

The neolignan schmiditin, together with lignin galgravin as well as friedelin, beta-sitosterol and its beta-O-glucoside have been isolated from the extract of aerial parts. The extract exhibited antiamoebic activity.

Piper sylvaticum Roxb.

Family ► *Piperaceae.*

Habitat ► Assam and Bengal.

Ayurvedic ► Vana-Pippali.

Folk ► Pahaari Peepal.

Action ► Fruit—carminative. Aerial parts—diuretic.

The root yielded a lignin, sesamin; amides (including piperine, piperlongumine) and beta-sitosterol.

Piper thomsoni Hook. f.

Family ► *Piperaceae.*

Habitat ► Sikkim, Bengal, Manipur, Khasi and Jaintia hills.

Folk ► Jangali Paan.

Action ► Root—(macerated in water) diuretic.

Piper wallichii Hand.-Mazz.

Synonym ► *P. aurantiacum* Wall ex DC.

Family ► *Piperaceae.*

Habitat ► Nepal, Lakhimpur and Khasi Hills in Assam.

Ayurvedic ► Wrongly equated with Sambhaaluka. (Sambhaalu has been identified as *Vitex negundo.*) Renukaa is also a wrong synonym (it is equated with the seed of *Vitex agnus-castus*).

Siddha/Tamil ► Kaattu-milagu.

Action ► Fruits—used as uterine stimulant.

The fruit contain piperine, piperettine and sylvatine, besides beta-sitosterol. The seeds gave aurantiamide, its acetate and auranamide.

The fraction, containing alkaloids, showed oxytocic activity. The lignin constituents inhibited platelet aggregation caused by platelet-activating factor.

Piscidia piscipula (Linn.) Sarg.

Synonym ► *P. erythrina* Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Native to America; introduced in India.

English ► Jamaica Dogwood.

Action ► Sedative, spasmolytic, analgesic, anti-inflammatory.

The bark gave several, isoflavonoids. Piscidone and piscerythrone exhibit spasmolytic activity. Piscidin glycoside and rotenone are toxic constituents.

The bark is used for neuralgia, migraine and insomnia in South America and West Indies.

In some *in vitro* tests, the root bark's extract exhibited antispasmodic effects as strong as papaverine's (*Natural Medicines Comprehensive Database,* 2007.)

Pisonia aculeata Linn.

Family ► *Nyctaginaceae.*

Habitat ► The sea coast in Peninsular India, also in the Andaman Islands.

Siddha/Tamil ► Karindu.

Folk ► Baghachuur (Bengal).

Action ► Bark and leaves—counterirritant for swellings and rheumatic pains. Fresh leaves—used as a wash for scabies.

Pisonia grandis R. Br.

Synonym ► *P. morindaefolia* R. Br. ex Wt.

Family ► *Nyctaginaceae.*

Habitat ► Cultivated in gardens in Chennai and other places near the sea on both east and west coasts.

English ► Lettuce tree.

Siddha/Tamil ► Chandi keerai, Leechai kottai keerai, Nachu Kottai keerai.

Action ► Fresh leaf—diuretic, used in inflammations (of elephantoid nature in legs and other parts). Root—purgative.

The plant gave octacosanol, beta-sitosterol, alpha-spinasterol, beta-sitosterol-beta-D-glucopyranoside, dulcitol and quercetin.

Pistacia integerrima Stewart ex Brandis.

Synonym ► *P. chinensis* Bunge subspecies *Integerrima* (Stewart) Rech. f.

Family ► *Anacardiaceae.*

Habitat ► The Himalayas from Indus to Kumaon.

Ayurvedic ► Karkatashringi, Shringi, Karkatashringikaa, Karkata, Karkataakhya, Kulirashringaaya, Kuliravishaanikaa, Vakraa, Vishaani. Ajashringi (also equated with *Gymnema sylvestre*).

Unani ► Kaakraasingi, Kakar.

Siddha/Tamil ► Karkatagasingi.

Action ► Gall—astringent, expectorant, antiasthmatic, antidysenteric, styptic.

Key application ► In cough, bronchitis and dyspnoea. (*The Ayurvedic Pharmacopoeia of India.*)

The tetracyclic triterpenes, pistacigerrimones A, B and C have been isolated from the galls produced on the leaves.

Alpha-pinene 21.8, beta-pinene 16.2, alpha-phellandrene 15.5 and delta-carene 11% are major constituents of the essential oil extracted from galls. The oil is reported to exhibit CNS-depressant, antispasmodic, carminative and antibacterial, antiprotozoal, antiamoebic, anthelmintic activities.

Dosage ► Gall—3–6 g powder. (*API,* Vol. I.)

Pistacia lentiscus Linn.

Family ► *Anacardiaceae.*

Habitat ► Mediterranean countries. The resin is imported into India.

English ► Mastic tree.

Unani ► Mastagi, Roomi Mastagi, Mastaki.

Siddha/Tamil ► Ponnuikan kungiliyam.

Action ► Resin—carminative, diuretic, stimulant, astringent.

The mastic gum contains 2% essential oil. The oil sample from Spain is reported to contain 90% monoterpene hydrocarbons, the major constituents of which are alpha-pinene 79% and myrcene 3%.

Chief components of the resin triterpenes are mastic acid, isomastic acid, oleanolic acid and tirucallol.

The lyophilized aqueous extract of the aerial parts gave steroid-triterpenes, catechin tannins, flavonoids, saponins, resins and sugars. In some regions of Spain, the aerial parts are used against hypertension.

There is some preliminary evidence that Mastic might have hypotensive and antioxidant effects. (*The Review of Natural Products* by Facts and Comparisons, 1999.)

For prevention of gastric and duodenal ulcers, some researchers think Mastic might have antisecretory and possibly cytoprotective effects. (*J Ethnopharmacol,* 15(3), 1986; *Natural Medicines Comprehensive Database,* 2007.)

Pistacia khinjuk Stocks is known as khinjak, Butum and Roomi Mastagi in Mumbai and Maharashtra. *P. terebinthus* Linn. is known as Kabuli Mustaki.

Pistacia vera Linn.

Family ► *Anacardiaceae.*

Habitat ► Native to eastern Mediterranean region, Iran, Afghanistan and Central Asian countries; cultivated in North India.

English ► Pistachio, Green Almond.

Ayurvedic ► Mukuulaka.

Unani ► Pistaa (Kernel), Ilk-ul-Ambaat (resin).

Action ► The kernel is used as a cardiac and brain tonic; flowers are included in prescriptions for leucorrhoea; husk is used against dysentery and as astringent in stomatitis and tonsillitis.

Pistia stratiotes Linn. var. **cuneata** Engl.

Family ► *Araceae.*

Habitat ► Tropical and sub-tropical Asia, Africa and America.

English ► Water Lettuce, Tropical Duckweed.

Ayurvedic ► Jalakumbhi, Vaariparni, Vaarimuuli.

Siddha/Tamil ► Agasatamarai.

Action ► Whole plant and root—diuretic, used for dysuria. Leaf—antitussive, demulcent, antidysenteric, externally applied to haemorrhoids, ulcers, skin diseases. Ash—applied to ringworm of the scalp.

The plant gave 2-*di*-C-glycosylflavones of vicenin and lucenin type, anthocyanin-cyanidin-3-glucoside, luteolin-7-glycoside and mono-C-glycosylflavones— vitexin and orientin.

Dosage ► Plant—10–20 ml juice. (*CCRAS.*)

P

Pithecellobium dulce Benth.

Family ► *Mimosaceae.*

Habitat ► Cultivated throughout the plains of India.

English ► Minila Tamarind, Madras Thorn, Quamachil.

Siddha/Tamil ► Karapilly, Kodukkaa Puli.

Folk ► Vilaayati Imli, Dakhini Babool.

Action ► Bark—astringent, febrifuge, antidysenteric. Stem-bark—spasmolytic. Seeds—anti-inflammatory.

The leaves contain alpha-spinasterol; its beta-D-glucoside, octacosanol, kaempferol, its 3-rhamnoside, behenic and lignoceric acids. An insulin-like principle has also been reported in the leaves.

Seeds gave kaempferol, quercetin and a saponin consisting of a mixture of oleanolic and echinocystic acid glycosides. Lecithin is also reported from seeds.

The seed exhibited haemolytic agglutinating reaction with human blood. Saponins from seeds show spermicidal activity.

The bark contains tannins (up to 37%) of a catechol type; non-tans 10–15%; 1.5% of pectin.

Pithecellobium monadelphum Kosterm.

Synonym ► *P. bigeminatum* auct. non-(L.) Mart. ex Benth.; *P. gracile* Bedd.

Family ► *Mimosaceae.*

Habitat ► Eastern Himalayas, Khasi, Jaintia and Lushai Hills.

Siddha/Tamil ► Kalpakku.

Folk ► Kachloraa.

Action ► Leaf—used externally as a mostrum for leprosy; also applied for promoting growth of hair. Seed—hypoglycaemic. Aerial parts—diuretic, spasmolytic.

The seeds contain 18.3% protein; major amino acids are aspartic acid 13.2, glutamic acid 10.9, alanine 9.7, leucine 8.3, glycine 8.2, serine 7.4%. Seeds contain a poisonous principle pithecolobine. They are used after repeated boiling and discarding of water.

Pittosporum dasycaulon Miq.

Family ► *Pittosporaceae.*

Habitat ► The rain forests of South India.

Folk ► Gapasundi (Maharashtra), Boogri (Karnataka).

Action ► Stem-bark—antibacterial, antifungal.

Pittosporum floribundum Wight & Arn.

Family ► *Pittosporaceae.*

Habitat ► Subtropical Himalayas, Ganjam, Konkan, Western Ghats and the Nilgiris.

Siddha/Tamil ► Kattu Sampangi.

Folk ► Tumari. Vikhaari, Vekhali (Maharashtra).

Action ► Bark—anti-inflammatory, antispasmodic, narcotic; used in chronic bronchitis; also administered in leprous affections; a paste is applied to inflammatory and rheumatic swellings.

The Himalayan plants yielded an essential oil (0.26%) with alpha-pinene, dipentene, linalool, cineol, methyl salicylate, decyl aldehyde, anisaldehyde, bergapten, eugenol, indole and salicylic and benzoic acids as major constituents. The oil is applied topically in sprains, bruises, sciatica, rheumatism, chest affections and in certain skin diseases.

The narcotic action of the bark is attributed to the presence of a yellow oleoresin. The bark also contain a saponin, pittosporin.

Plantago amplexicaulis Cav. var. **bauphula** (Edgew.) Pilger.

Family ► *Plantaginaceae.*

Habitat ► Punjab, Rajasthan and Delhi.

English ► Brown Ispaghula.

Unani ► Aspaghol.

Action ► Seed—astringent. Seed coat—demulcent.

See *Plantago ovata.*

Plantago lanceolata Linn.

Family ► *Plantaginaceae.*

Habitat ► Western Himalayas, from Kashmir to Garhwal and Simla.

English ► Rib Grass, Ribwort Plantain, English Plantain, Buckhorn Plantain.

Unani ► Baartang, Aspaghol.

Folk ► Balatang.

Action ► Leaf and root—astringent, bechic, antiasthmatic, anti-inflammatory, hypothermic, diuretic. Seed—cathartic, diuretic, haemostatic.

Key application ► Internally, for catarrhs of the respiratory tract and inflammatory alterations of the oral and pharyngeal mucosa; externally for inflammatory reactions of the skin. (*German Commission E, ESCOP.*)

Globularin and methyl ester of desacetyl asperulosidic acid were isolated from the plant along with catapol. A crude mucilage, isolated from the leaves, contains L-arabinose 26.0, D-galactose 35.8, D-glucose 21.9, D-mannose 4.6, L-rhamnose 4.6 and uronic acid 6.9%. Alpha-D-glucan was separated from this mucilage.

Leaves gave aucubin and esculetin, in addition to polysaccharides. The whole plant yielded rhamnosidoglycoside of caffeic acid. Seeds contain 1.1% aucubin. Aucubin exhibits antibacterial activity. Hepatoprotective effect is also attributed to the aucubin content.

Alcoholic extract of young leaves exhibit antibacterial action against *Streptococcus betahaemolyticus, Micrococcus pyogenes* var. *aureus* and *Bacillus subtilis,* thus confirming their wound-healing properties.

Plantago major Linn.

Family ► *Plantaginaceae.*

Habitat ► The temperate and alpine Himalayas from Kashmir to Bhutan at altitudes of 600–3,500 m.

English ► Broadleaf Plantain.

Ayurvedic ► Ashvagola (var.).

Folk ► Isabgol.

Action ► Plant—haemostatic, antihistaminic, antibacterial, wound-healing in burns and inflammation of tissues. Leaves—cooling, astringent, diuretic, vulnerary, febrifuge. Used for diarrhoea, bacillary dysentery, hepatitis, urinary diseases, piles, ulcers and skin diseases. Leaves are used for cystitis with blood, haematuria and other bladder disorders.

P

The aqueous extract of the leaves showed anti-inflammatory activity in mice.

The aerial parts contain an iridoid glucoside, majoroside. The leaves contain a phenylpropanoid glycoside, plantamajoside, exhibiting antibacterial activity against several pathogenic bacteria including *E. coli* and *Staphylococcus aureus.* (The glycoside is less inhibitory than the free acids, caffeic, ferulic, and rosmarinic and esculetin.)

Plantago ovata Forsk.

Synonym ► *P. ispaghula* Roxb.

Family ► *Plantaginaceae.*

Habitat ► Cultivated in parts of Rajasthan and Maharashtra.

English ► Ispaghula, Spogel seeds, Blond Psyllium.

Ayurvedic ► Ashvagola. Ashwakarna (also equated with *Shorea robusta*).

Unani ► Aspaghol.

Siddha/Tamil ► Isapppa.

Folk ► Isabgol.

Action ► Seed and husk—laxative, diuretic, demulcent, bechic, cholinergic. Used in inflammatory conditions of the mucous membrane of gastrointestinal and genitourinary tract, chronic amoebic and bacillary dysentery; also in hypercholesterolemia.

Key application ► In chronic constipation and irritable bowel. (*German Commission E.*) Also in constipation due to duodenal ulcer or diverticulitis (*WHO.*) *German Commission E* also noted that Blond Psyllium seed lowers serum cholesterol levels. It has also been shown to slow sugar absorption thereby reducing blood glucose. (*ESCOP.*) Use of Blond Psyllium husk up to six months did not clinically alter vitamin or mineral status in a review of eight human trials. It did not reduce absorption of calcium. (*J Am Geriatr Soc,* 43, 1995; *Am J Clin Nutr,* 71, 2000; *Natural Medicines Comprehensive Database,* 2007.)

The seed contains amino acids including valine, alanine, glutamic acid, glycine, cystine, lysine, leucine and tyrosine; and a mucilage consisting of a mixture of polysaccharides composed mainly of xylose, arabinose and

galacturonic acid; rhamnose and galactose are also present. The seeds also gave aucubin, the antibacterial principle. The seed coat contains fatty acids mainly linoleic, oleic and palmitic acids in decreasing concentrations.

The seeds show a liver protective effect on induced hepatotoxicity in mice. In China, the plant is used clinically to treat certain types of hepatitis (activity due to aucubin content).

Dosage ► Husk—5–10 g. (*CCRAS.*)

Platanus orientalis Linn.

Family ► *Platanaceae.*

Habitat ► Native to eastern Mediterranean region; cultivated in Kashmir and North-western Himalayas at 1,200–2,400 m.

English ► Oriental Plane, Oriental Sycamore. European Plane tree.

Folk ► Chinaar, Buin (Kashmir and Punjab).

Action ► Bark—antidiarrhoeal, antiscorbutic, antirheumatic. Leaf—astringent. Buds—antiseptic, used for urinary infection.

The buds yielded kaempferol, its derivatives and caffeic acid. The methanolic extract exhibits antiseptic and antimicrobial activities.

The bark contains 1.5% of platanin, also 5.9% tannin and 7.3% non-tans. The shoots and leaves contain alantoin; roots phlobaphene. The sap of the tree contains up to 90% mannitol. A triterpene, platanolic acid, is found in most parts of the plant except the fruit.

Platycodon grandiflorum (Jacq.) A. DC.

Family ► *Campanulaceae.*

Habitat ► East Asia; introduced into India and cultivated in rockeries and borders.

English ► Balloon Flower, Chinese Bell Flower.

Action ► Expectorant and antitussive. Root—used to treat cough, tonsillitis and asthma, also to treat stomatitis, peptic ulcer and inflammatory diseases. (*WHO.*)

The major chemical constituents of the root are triterpene saponins. The root exhibits haemolytic action.

Plectranthus mollis Spreng.

Synonym ► *P. incanus* Link.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Temperate Himalayas from Simla to Sikkim and in Bihar, Madhya Pradesh and Western Ghats.

Folk ► Laal-Aghaadaa (Maharashtra).

Action ► Leaves—styptic, febrifuge.

The aerial parts yielded an essential oil (0.35%) containing piperitenone oxide (45.01) and *cis*-pipestone oxide (35.70%) as major constituents.

The antimicrobial activity of 10 mg of the oil was found to be the same as that of 10 units of penicillin G. sodium. The essential oil also exhibited cardiac depressant, respiratory stimulant and vasoconstrictor action. The leaves and

P

flowering tops, in addition to the oil, also contain resin and tannin.

Plesmonium margaritiferum Schott.

Family ► *Araceae.*

Habitat ► Bengal, Chhota Nagpur, Ranchi, Purnea, Vishakhapatnam and Tamil Nadu.

Ayurvedic ► Vajrakanda.

Folk ► Kharhar (Uttar Pradesh).

Action ► Anti-inflammatory (well-ground tubers are rubbed on swellings of the extremities). Seeds—externally applied to bruises. The tubers are poisonous (can be eaten after several boilings).

P

Pluchea indica Less.

Family ► *Compositae; Asteraceae.*

Habitat ► Sundarbans, in salt marshes and mangrove swamps.

Folk ► Kukarondh, Manjurukh (Bengal).

Action ► Root and leaves—astringent, antipyretic; given in decoction as a diaphoretic in fevers. Leaf—juice is given for dysentery; an infusion for lumbago, also against leucorrhoea. Root—anti-inflammatory, hepatoprotective.

The aerial parts contain terpenic glycosides. The root contains sesquiterpenes, lignin glycosides, thiophene derivatives.

The extracts of defatted roots showed significant anti-inflammatory activity. The extracts inhibited protein exudation and leucocyte migration.

Neuropharmacological studies on different experimental models of rodents exhibited potent central nervous system depressant activity.

The methanolic fraction of the extract exhibited significant hepatoprotective activity against induced hepatotoxicity in rats and mice. The extract also caused significant reduction in the elevated serum enzyme levels and serum bilirubin content in acute liver injury.

Pluchea lanceolata C. B. Clarke.

Family ► *Compositae; Asteraceae.*

Habitat ► Punjab, Upper Gangetic plains, Gujarat, Rajasthan.

Ayurvedic ► Raasnaa, Rasanaa, Raasnikaa, Rasaa, Yuktaa, Yuktrasaa, Suvahaa, Elaaparni.

Folk ► Vaaya-surai (Uttar Pradesh), Raayasan.

Action ► Aerial parts—smooth muscle relaxant. Stem—anti-inflammatory. *Pluchea lanceolata* is the source of Raasnaa in Punjab, Uttar Pradesh and Gujarat. *Vanda roxburghii* is used as Raasnaa in Bengal. Throughout South India, *Alpinia galanga* is accepted as Raasnaa.

The stem and leaves contain moretenol, moretenol acetate, neolupenol, octacosanoic, hexacosanoic and tetracosanoic acid, tetracosanol, hexaco-

sanol, triacontanol, stigmasterol and beta-sitosterol-D-glucoside.

The petroleum extract of the stem and leaves and the chloroform-soluble portion of the methanolic extract exhibited 31.9% and 54.5% antioedema activity, respectively. The triterpenes, moretenol acetate, moretenol and neolupenol exhibited 55.2, 32,8 and 39.7% anti-inflammatory activity respectively as against ibuprofen as standard exhibiting 65.5% activity.

Plumbago capensis Thunb.

Synonym ▶ *P. auriculata* Lam.

Family ▶ *Plumbaginaceae.*

Habitat ▶ Native to South Africa; grown in gardens in India.

Ayurvedic ▶ Nila-chitraka (blue-flowered var.). (Bears pale-blue flowers.)

Action ▶ See *P. zeylanica.*

Plumbago indica Linn.

Synonym ▶ *P. rosea* Linn.

Family ▶ *Plumbaginaceae.*

Habitat ▶ Indigenous to Sikkim and khasi hills, grown in Indian gardens.

English ▶ Rose-coloured Leadwort.

Ayurvedic ▶ Rakta-chitraka (red-flowered var.).

Siddha/Tamil ▶ Chittramoolam.

Action ▶ See *P. zeylanica. P. indica* is preferred in West Bengal and Kerala. Both *P. indica* and *P. zeylanica* contain about 0.9% plumbagin.

Plumbago zeylanica Linn.

Family ▶ *Plumbaginaceae.*

Habitat ▶ Cultivated in gardens throughout India; also found wild in Peninsular India.

English ▶ Ceylon Leadwort, Leadwort.

Ayurvedic ▶ Chitraka, Agni, Vahni, Jvalanaakhya, Krshaanu, Hutaasha, Dahana, Sikhi.

Unani ▶ Sheetraj Hindi.

Siddha/Tamil ▶ Chittramoolam.

Action ▶ Root—intestinal flora normalizer, stimulates digestive processes; used for dyspepsia. Root paste is applied in order to open abscesses; a paste prepared with milk, vinegar or salt and water, is used externally in leprosy and other obstinate skin diseases. A cold infusion is used for influenza and black-water fever.

Key application ▶ In sprue, malabsorption syndrome, piles and inflammatory diseases of ano-rectum. (*The Ayurvedic Pharmacopoeia of India.*)

The root yielded naphthoquinone derivatives, plumbagin being the most important active principle.

The root extract, after processing for plumbagin enhancement, has been used in a number of drug formulations for liver ailments. Experimentally, plumbagin prevented the accumulation of triglycerides in liver and aorta

and regressed atheromatous plaques and abdominal aorta. The chloroform extract of the root showed significant activity against pencillin-resistant (also non-pencillin resistant) strains of *Neisseria gonorrhoea.* (The root is used for treating sexually transmitted diseases in traditional Indian medicine.)

In Siddha medicine, in Tamil Nadu, the plant is an ingredient in a number of drug formulations for treating cancers of the uterus, breast, lungs and oral cavity, in addition to haemorrhoids.

Plumbagin is abortifacient, antiovulatory; causes selective testicular lesions in dogs; in lower doses it behaves like a spindle poison, in higher concentration exhibits radiomimetic nucleotoxic and cytotoxic effects.

Dosage ► Detoxified root—1–2 g powder. (*API,* Vol. I.)

P

Plumeria acuminata Ait.

Family ► *Apocynaceae.*

Habitat ► Native to Mexico; cultivated in Indian gardens.

English ► Pagoda tree.

Action ► Root bark—used in herpes, sexually transmitted diseases. Bark—stimulant, emmenagogue. Root—violent cathartic. Latex—purgative, rubefacient.

Iridoids are present in the leaf, stem, flower and root. Plumieride glucoside has been isolated from all parts of the plant. The plumeric acid, isolated from leaves, exhibits promising cytotoxic activity.

Fulvoplumierin (a pigment) inhibits the growth of various strains of *Mycobacterium tuberculosis.*

Plumeria alba Linn.

Family ► *Apocynaceae.*

Habitat ► Native to West Indies; cultivated in Indian gardens.

English ► White Champa.

Ayurvedic ► Kshira Champaka (white-flowered var.).

Siddha/Tamil ► Perumal Arali, Seemai Arali.

Action ► Root bark—used in blennorrhagia. Bark and latex—used externally in herpes, syphilitic ulcers and scabies. Seed—haemostatic.

The root gave iridoids—iso-plumericin, plumericin, plumieride, plumieride coumarate and its glucoside. The bark gave alpha-and beta-amyrin and their acetates, beta-sitosterol, scopoletin and plumieride. The flowers also contain plumieride coumarate and its glucoside, in addition to quercetin derivatives.

Plumeria rubra Linn.

Family ► *Apocynaceae.*

Habitat ► Native to Mexico; grown throughout India.

English ► Red Jasmine.

Ayurvedic ► Kshira Champaka (red-flowered var.).

Action ► Root bark—used in blennorrhagia. Flower—bechic (used in pectoral syrups). Bark—a decoction is used in venereal diseases and leprosy.

The bark contains cytotoxic iridoids (including fulvoplumierin which also inhibits the growth of *Mycobacterium tuberculosis*) and the lignin, liriodendrin.

The plant contains the triterpene rubrinol which showed antibacterial activity against Gram-positive and Gram-negative bacteria, including *Pseudomonas aeruginosa* (a causative agent responsible for infecting burns, wounds, urinary tract and infection in cystic fibrosis) and *Pseudomonas pseudomallei* (which causes melioidosis or pseudoglandess).

The herb contains cardiac glycosides which have a narrow-margin of safety. (Sharon M. Herr.)

Podophyllum hexandrum Royle.

Synonym ► *P. emodi* Wall. ex Hook. f. & Thoms.

Family ► *Berberidaceae.*

Habitat ► Inner ranges of the Himalayas, from Kashmir to Sikkim at 1,800–4,000 m.

English ► Indian Podophyllum.

Ayurvedic ► Giriparpata.

Folk ► Bana-kakari (Punjab), Venivel (Gujarat), Patvel (Maharashtra). Paapraa, Paapri.

Action ► Rhizomes and roots—antineoplastic. Strongly irritant to skin and mucous membranes. Used topically as an ointment for venereal warts, verrucae and similar conditions.

Key application ► *P. peltatum*—externally, for removal of pointed condyloma (skin adjacent to the treated area should be protected). (*German Commission E.*) *P. hexandrum*: Podophyllin (10–40%) for external application, 2–6 h weekly, for anogenital warts. (*Indian Herbal Pharmacopoeia.*) (Podophyllin is a mitotic poison.)

May Apple of North America is equated with *Podophyllum peltatum* Linn. The main lignin is podophyllotoxin. *Podophyllum hexandrum* contains similar lignans with the exception of alpha-and beta-peltatins, which are reportedly absent; the concentration of podophyllotoxin is up to 4.3%. *P. peltatum* contains about 0.25% and the Taiwanese species *P. pleianthum* 0.1% podophyllotoxin.

(Podophyllotoxin is a valuable lignin, as it is used for the synthesis of chemically administered cytostatic etoposide and tenoposide.)

Podophyllum sikkimensis R. Chatterji & Mukerjee.

Family ► *Berberidaceae.*

Habitat ► Sikkim.

Folk ► Paapraa (var.).

Action ► Resin—used against tumours.

The rhizomes and roots yield 7.5% resin which gave a lignin lactone desig-

P

nated sikkimotoxin; also 3-galactosidyl quercetin, quercetin and isorhamnetin. It is yet to be established that the lactone possesses properties analogous to those of podophyllotoxin.

Pogostemon benghalensis Kuntze.

Synonym ► *P. plectranthoides* Desf.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Throughout greater part of India.

Folk ► Ishwar-jataa. Jui-lataa (Bihar, Bengal). Phaangalaa (Maharashtra).

Action ► Root—used in haemorrhage, especially in uterine haemorrhage. Leaf—styptic; used for cleaning wounds. Essential oil—antifungal. Acetone extract—insecticidal, insect repellent.

Pogostemon pubescens Benth., synonym *P. parviflorus* Benth. is also known as Phaangalaa in Maharashtra. Aerial part exhibits antifungal and leaf antibacterial activity.

Sesquiterpene lactone, caryophyllen-9-beta-10-olide, has been isolated from the whole plant.

Pogostemon purpurascens Dalz. (Manipur and South-western India) also possesses properties similar to *P. benghalensis.* The acetone extract exhibited larvicidal activity against the larvae of malaria vector, *Anopheles stephensi.* It also showed activity against yellow fever mosquito.

P

Pogostemon cablin Benth.

Synonym ► *P. patchouli* var. *sauvis* Hook. f.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to the Philippines; introduced in India.

English ► Patchouli.

Ayurvedic ► Paachi.

Folk ► Paanari.

Action ► Plant—insecticidal. Leaves—an infusion is given in menstrual troubles.

The oil, extracted from dried leaves, is reported to possess antibacterial activity against *E. coli, Staphylococcus aureus, Streptococcus pyogenes, Bacterium coli* and *B. typhosum.* It is also found effective against *Mycobacterium tuberculosis.* The oil is used in insect-repellent preparations.

Pogostemon parviflorus Benth.

Synonym ► *P. pubescens* Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Hills of South-western India, ascending to 1,200 m.

Folk ► Phaangalaa (Maharashtra).

Action ► Aerial parts—antifungal, antibacterial.

Acetone extract of the aerial parts exhibits larvicidal activity against the larva of malaria vector, *Anopheles stephensi* and *Culex quinquefasciatus.*

Pogostemon patchoulis Hook. f. non-Pelletier.

Synonym ► *P. heyneanus* Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Western Ghats of Karnataka, Kerala and the Nilgiri hills up to 1,800 m.

English ► Patchouli.

Ayurvedic ► Paachi, Pancholi.

Siddha/Tamil ► Kadir Pachai.

Folk ► Paanch (Maharashtra), Sugandhi Paanadi (Gujarat).

Action ► Leaf—bechic, antiasthmatic. A poultice of leaves is applied to boils and to relieve headache.

The plant gave alpha-pyrone derivatives, pogopyrones A and B; *n*-octacosanol, beta-sitosterol and its glucoside and several flavones. Pogopyrone B exhibited cytotoxic activity.

Polianthes tuberosa Linn.

Family ► *Amaryllidaceae.*

Habitat ► Native to Mexico; cultivated for ornamental use.

English ► Tuberose.

Ayurvedic ► Rajanigandhaa.

Siddha/Tamil ► Nilasampangi.

Folk ► Gulcheri, Gulshabbu.

Action ► Flowers and bulbs—diuretic. Externally used for skin eruptions. The bulbs are rubbed with turmeric and butter and applied over red pimples of infants. The bulbs are reported to contain an alkaloid, lycorin, which causes vomiting.

Dried and powdered bulbs are used for gonorrhoea.

Polyalthia longifolia Thw.

Family ► *Annonaceae.*

Habitat ► Native to Sri Lanka; grown in gardens throughout the warmer parts of India.

English ► Mast tree, Fake Asoka tree, False Devadaru, Cemetry tree

Ayurvedic ► Devadaari (Devadaaru is equated with *Cedrus deodara*). (An adulterant to the bark of *Saraca asoca.*)

Siddha/Tamil ► Nettilingam.

Action ► Febrifuge. Causes cardiac depression.

The stem bark contains clerodane diterpenes, polyalthialdoic acid and kolavenic acid. The stem and its bark also contain the cytotoxic aporphine alkaloid, liriodenine, besides *nor*-oliveroline and oliveroline-beta-N-oxide. Azafluorene alkaloids are also present in the bark and leaves. The leaf exhibits fungitoxic activity.

Polyalthia simiarum Hook. f. & Thoms. (Orissa, Assam, Bengal, Bihar, Eastern Himalaya) is also equated with Fake Ashoka tree. It is known as Boga-khamtou in Assam, Wojarah, Mongai in Orissa and Labshi, Kutti in Nepal.

Polyalthia suberosa Thw. (from Assam to Uttar Pradesh in the North and Kerala in the South) is known

as Chamkhirni. The leaves contain alpha-and beta-amyrin, lupeol, beta-sitosterol, stigmasterol and campesterol. The stems and leaves contain the triterpene, suberosol, which showed anti-HIV replication activity. The stem bark contains alkaloids, oxostephanine and lanuginosine, which exhibited antibacterial activity against several Gram-positive and Gram-negative bacteria.

Polycarpaea corymbosa Lam.

Family ▶ *Caryophyllaceae.*

Habitat ▶ Throughout the greater part of India, ascending up to 2,100 m in the Himalaya.

Ayurvedic ▶ Parpata (substitute).

Siddha/Tamil ▶ Nilaisedachi.

Folk ▶ Pittapaaparaa (Uttar Pradesh), Rupaaphuli (Gujarat).

Action ▶ Leaves—anti-inflammatory, applied as poultice. Also prescribed in jaundice in the form of pills with molasses. Flowering head, along with stem and leaves—astringent, demulcent. Plant—spermicidal.

The plant gave camelliagenins (barrigenol) and stigmasterol.

Polycarpon prostratum (Forsk.) Alschers & Schweinf.

Synonym ▶ *P. loeflingii* Benth. & Hook. f.

Family ▶ *Caryophyllaceae.*

Habitat ▶ Throughout the warmer parts of India in fields and waste places.

Folk ▶ Ghima, Suretaa.

Action ▶ Leaves—an infusion of roasted leaves is given for cough following fever, particularly in measles.

Alcoholic extract of the plant exhibits spasmolytic activity. The aerial parts contain tetrahydroxy triterpenes. Presence of a triterpenoid saponin, and hentriacontane, hentriacontanol, beta-amyrin and its acetate, beta-sitosterol and stigmasterol is also reported.

Polygala chinensis auct. non Linn.

Synonym ▶ *P. arvensis* Willd.

Family ▶ *Polygalaceae.*

Habitat ▶ Throughout India and the Andamans.

English ▶ Senega.

Folk ▶ Meradu, Maraad, Negali (Maharashtra). Maraad (Nepal).

Action ▶ Root—antiasthmatic; used as a substitute for Senega obtained from the American plant *Polygala senega.* (In Chinese medicine Senega refers to *P. tenuifolia* Willd.)

Key application ▶ Senega Root—in productive cough, catarrh of the respiratory tract and chronic bronchitis. (*German Commission E, ESCOP, WHO.*)

Senega yielded lactonic lignans, their glycosides and flavonol glycosides. The root gave arctiin, afzelin,

myricitrin and rutin. A triterpenic saponin was also obtained from the plant. The root contains salicylic acid, methyl salicylate and senegin (a saponin mixture).

Senega is used for chronic bronchitis, catarrh, asthma and croup, as an infusion.

Related species are: *P. chinesis* Linn., synonym *P. glomerata* Lour; *P. telephioides* Willd., synonym *P. brachystachya* DC. non-Bl., found throughout the plains of India. Both the plants are used as expectorant, antiasthmatic and anticatarrhal.

Toxic constituents of Polygala senega root are: triterpene saponins—6–16% senegasaponins A-D with aglycone presenegenin or senegin. Saponins irritate GI tract mucosa and cause reflex secretion of mucous in the bronchioles.

A French patent is used against graft rejection, eczema and multiple sclerosis as an anti-inflammatory drug.

Polygala crotalarioides Buch.-Ham. ex DC.

Family ► *Polygalaceae.*

Habitat ► Tropical Himalayas from Simla to Sikkim and the Khasi Hills.

Folk ► Lilakanthi, Lilakaathi. (Bihar). Maraad (var.).

Action ► Root—used for cough and pulmonary catarrh; chewed or ground and drunk with water to expel phlegm from the throat; provokes coughing.

Polygala sibirica Linn.

Synonym ► *P. heyneana* Wall. ex W. & A.

Family ► *Polygalaceae.*

Habitat ► Throughout the Himalayas and Western Ghats.

English ► Common Milkwort.

Folk ► Negali, Meradu (var.).

Action ► Leaves—used in spermatorrhoea. Root—a decoction is given as an expectorant in cold and cough and chronic chest diseases. (Used as a substitute for Senega.) Also used for inflammation of urinary bladder; externally for mammary abscesses and carbuncles.

Polygonatum cirrhifolium (Wall.) Royle.

Family ► *Liliaceae.*

Habitat ► Northern Himalayas, from 1,500 to 3,300 m.

Ayurvedic ► Mahaa-medaa, Medaa, (substitute: *Asparagus racemosus*, also Saalab-misri.)

Folk ► Devarigaanl (Gharwal).

Action ► Root—rejuvenating tonic for nervous system.

The root gave neoprazerigenin A-3-O-beta-lycotetraoside (PS-III) and its methyl proto-type congener (PS-II) and steroidal saponins, sibiricoside A (PS-I) and sibiricoside B (PS-IV).

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Polygonatum multiflorum All.

Family ► *Liliaceae.*

Habitat ► Western Himalayas from Kashmir to Kumaon and in Manipur.

English ► Solomon's Seal.

Ayurvedic ► Mahaa-medaa, Medaa (var.). (Substitute: *Asparagus racemosus.*)

Action ► Anti-inflammatory, nervine, astringent. Used as an infusion for pulmonary complaints; as a poultice for piles and bruises.

The root and herb gave diosgenin and its glycosides.

Dosage ► Root—3–5 g powder. (*CCRAS.*)

Polygonatum verticillatum All.

Family ► *Liliaceae.*

Habitat ► Temperate Himalayas and Manipur.

Ayurvedic ► Medaa. (Substitute: *Asparagus racemosus.*)

Unani ► Shaqaaqul. (Substitute: *Pastinaca secacul.*)

Folk ► Mithaa-dudhiaa.

Action ► Used in Tibetan medicine for treating emaciation, senility, pulmonary affections. The rhizomes is valued as salep.

The dried rhizomes contain 6.2–9% diosgenin.

The lactins of the rootstock did not contain carbohydrates; the amino acid revealed presence of 28% aspartic acid and asparagine.

The plant exhibits diuretic properties. It gave a digitalis glucoside and is considered poisonous by the hill people in the Himalayas.

Polygonum affine D. Don.

Synonym ► *Bistorta affinis* (D. Don) Green.

Family ► *Polygonaceae.*

Habitat ► Himalayas from Kashmir to Nepal at altitudes of 2,400–4,800 m.

Folk ► Khukhudi.

Action ► Flowers—stimulant.

The inflorescence gave flavonoids, including quercetin, isorhamnetin, luteolin and apigenin derivatives. The leaves contain the flavonoids, 8-C-glucosyltricin and isorhamnetin.

Polygonum aviculare Linn.

Family ► *Polygonaceae.*

Habitat ► From Kashmir to Kumaon.

English ► Knotgrass, Knotweed, Mexican Sanguinaria.

Folk ► Machoti, Kesri.

Action ► Astringent and haemostatic. Used for excessive menstruation, bleeding piles; bleeding from bowel, stomach, lungs, nose, throat; mucous colitis, children's summer diarrhoea.

Key application ► In mild catarrhs of the respiratory tract, inflammatory changes to the oral and pharyngeal mucosa. (*German Commission E.*)

The plant gave flavonoids including quercetin, avicularin, quercitrin, and derivatives of kaempferol, esculetin and scopoletin. The plant also gave gallic, caffeic, oxalic., silicic, chlorogenic and *p*-coumaric acids; tannins including catechin.

The methanolic extract of the plant showed high protection against CCl4-induced hepatotoxicity in mice. This activity is attributed to the presence of flavonoid glucosides.

The flavonoids exhibit astringent properties and are found to decrease capillary fragility and have a cortisone-like-effect on gingival tissue. (*J Ethnopharmacol,* 74(1), 2001.)

Polygonum bistorta Linn.

Synonym ► *P. paleaceum* Wall. ex Hook. f.

Family ► *Polygonaceae.*

Habitat ► The Himalayas from Kashmir to Sikkim and the hills of Assam.

English ► Snake Weed, Bistort, Dragon Wort.

Unani ► Anjabaar.

Action ► Anti-inflammatory, haemostatic, astringent, demulcent, anticatarrhal, antidiarrhoeal. Used for internal haemorrhages, irritable bowel, diverticulosis, urinary and uterine affections. Used as a mouth wash and gargle for ulcerated mouth and bleeding gums.

The herb contains ferulic, sinapic, vanillic, syringic, melilotic, *p*-coumaric, *p*-hydroxybenzoic, gentisic, salicyclic and ellagic acids, about 15–20% tannins mainly catechins.

When administered before the induction of adjuvant arthritis, the aqueous-ethanolic extract of the herb inhibited both the maximal oedema response and the total oedema response in rat.

Polygonum glabrum Willd.

Family ► *Polygonaceae.*

Habitat ► Throughout India in marshy places, up to 1,900 m. in the hills.

Ayurvedic ► Rakta-rohidaa (Gujarat).

Siddha/Tamil ► Attalaree.

Action ► Plant juice and rootstock—used in pneumonia, consumption, jaundice, fevers. Leaf—antispasmodic. Used for colic.

The leaves contain flavonoids—quercetin, rhamnetin, quercitrin, avicularin and rutin. Flowers contain pigments, delphinidin-3,5-diglucoside and cyanidin-3,5-diglucoside and quercetin.

The methanolic aqueous extract of the leaf gave a pure anthelmintic substance, a terpenoid (PGA). (The herb is used as an anthelmintic in Sudan.)

P

Polygonum hydropiper Linn.

Family ► *Polygonaceae.*

Habitat ► Throughout India in wet places.

English ► Water Pepper, Pepperwort, Smartweed.

Folk ► Paakur-muula, Paani-maricha (Bengal).

Action ► Haemostatic, astringent, anti-inflammatory, diuretic, lithotriptic, emmenagogue (used as infusion for delayed menses and amenorrhoea), antifungal (root and leaf used externally). Contraindicated during pregnancy.

The herb contains sesquiterpenes, including warburganal and polygodial, in the leaves; polygonal, isodrimeninol, isopolygodial and confertifolin in the seeds; and flavonoids including quercetin, kaempferol, isorhamnetin and rhamnesin; polygonolide (an isocoumarin).

Isoquercitrin exhibited significant anti-oxidative activity. Polygodial and warburganal possess significant antifungal property. Warburganal also possesses potent cytotoxic and antibiotic activity. (The herb is used against cancer.)

Polygonum plebeium R.Br.

Family ► *Polygonaceae.*

English ► Throughout warmer parts of India in moist areas, ascending to 2,100 m in the Himalayas.

Ayurvedic ► Sarpaakshi (a confusing synonym).

Folk ► Muniyaaraa (Bihar), Raaniphool, Macheti, Dubiaa Saaga.

Action ► Galactogenic, antidiarrhoeal. Powdered herb is given in pneumonia.

The whole plant yields 11% tannin. The rootstock contains oxymethylanthraquinone.

Flowers gave oleanolic acid, betulinic acid, *epi*-friedelanol, beta-sitosterol, and flavonoids—quercetin, quercetin-3-arabinoside and quercetin-3-rutinoside.

Polygonum viviparum Linn.

Family ► *Polygonaceae.*

Habitat ► The Himalayas from Kashmir to Sikkim at 3,300–4,800 m.

English ► Viviparous Bistort.

Unani ► Anjabaar. (substitute).

Folk ► Billori, Maamekh (Punjab).

Action ► Rootstock—astringent, antidiarrhoeal, antileucorrhoeic, antiseptic, antiperiodic. Used in haemoptysis; also for gleet. A decoction is used as a gargle for sore throat and spungy gums, as a lotion for ulcers.

Polypodium vulgare Linn.

Family ► *Polypodiaceae.*

English ► Polypody Root.

Unani ► Bisfaayaj.

Action ► Expectorant, laxative, stomachic, cholagogue, alterative, antistress. Used in cough, bronchitis, catarrh, loss of appetite, dyspepsia; and in skin diseases.

The rhizome gave saponin glycosides, based on polypodosapogenin, including osladin; ecdysteroids; phloroglucin derivatives; tannin.

Polyporus officinalis Fries

Family ► *Polyporaceae.*

Habitat ► On the old trunks of various coniferous trees.

English ► White Agaric.

Unani ► Ghaariqoon.

Action ► Used in the treatment of sweats in wasting diseases such as phthisis (it checks profuse sweats); also as an expectorant and diuretic.

The drug contains agaric acid (agaricin). The resinous extract, when burnt, yields not more than 2% of a white ash, rich in phosphates. The drug gives 4–6% soft resin.

Agaric acid acts as a counter-irritant when applied to abraded surfaces or mucous membrane.

Polyscias fruticosa (L.) Harms.

Synonym ► *Nothopanax fruticosum* (L.) Miq.
Panax fruticosus L.

Family ► *Araliaceae.*

Habitat ► Cultivated in gardens all over India.

Action ► Leaf—used in sinusitis, headache, migraine, tonsillitis. Stem bark—used for promoting expulsion of placenta after child birth. Root—antibacterial, antifungal, diuretic. Leaf and root—used in dysuria.

The root contains polyacetylenes, falcarinol and heptadeca derivatives. Falcarinol and heptadeca exhibited strong antibacterial activity against Gram-positive bacteria and the dermatophytic bacteria, also showed antifungal activity. The antibacterial activity of falcarinol was found to be 15 to 35 times stronger than that of erythromycin, chloramphenicol and oxytetracyclin.

Polyscias scutellaria (Burm. f.) F. R. Fosberg (commonly grown in Indian gardens) exhibits anti-inflammatory activity. The leaves contain several triterpenoid saponins, polyscisaponins, oleanolic acid derivatives.

Pongamia pinnata Pierre.

Synonym ► *P. glabra* Vent.
Derris indica (Lam.) Benett.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Western Ghats, tidal forests up to 1,200 m.

English ► Pongam Oil tree, Indian Beech.

Ayurvedic ► Karanja.

Siddha/Tamil ► Pungam.

Action ► Oil—applied in scabies, herpes, leucoderma and other cutaneous diseases; over chest in pneumonia and cold; also used

internally as cholagogue in sluggish liver. Leaves—juice is prescribed in flatulence, dyspepsia, diarrhoea and cough. An infusion is given for leprosy and gonorrhoea. Root—a paste is used in scrofulous enlargements; juice is used for cleaning foul ulcers and closing fistulous sores. Stem bark—given internally in bleeding piles. Rind of pod and seed—prescribed in bronchitis and whooping cough. Leaf and seed—antileprotic. Leaf and seed oil—antirheumatic.

The tree is rich in flavonoids and related compounds. These include simple flavones, furanoflavonoids, chromenoflavones, chromenochalcones, coumarones, flavone glucosides, sterols, triterpenes and a modified phenylalanine dipeptide. Seeds and seed oil gave karanjin, pongamol, pongapin and kanjone.

The aqueous extract of stem bark shows significant sedative and antipyretic effects in rats, and antispasmodic effect *in vitro* on smooth muscles.

In Indonesia, a decoction of the bark is drunk after child birth.

The aqueous extract of seeds showed significant antiviral activity against herpes simplex viruses HSV-1 and 2 cell lines experimentally. Albino rats, treated with the aqueous extract of seeds, recovered faster from induced infection and skin-burn than the untreated ones.

Dosage ► Seed—250 mg powder; 5–10 g for decoction. (*API,* Vol. I.)

P

Populus alba Linn.

Family ► *Salicaceae.*

Habitat ► Northwestern Himalaya at 1,200–3,000 m, also grown in avenues.

English ► White Poplar.

Folk ► Safedaa, Jangali Fraas.

Action ► Bark—antirheumatic, anti-inflammatory, antibacterial, antipyretic, diuretic, febrifuge, stimulant, antiseptic. Used for arthritis, rheumatic affections, cystitis and other urinary diseases, stomach and liver disorders, anorexia and debility.

Key application ► Unopened leaf-buds externally for haemorrhoids, frostbite and sunburn. (*German Commission E.*)

The bark contains glycosides, salicin and populin, erisin and tannin (5–9%). Salicin, a bitter tonic and antiperiodic, is used like quinine in intermittent fever, also in rheumatism.

Populus nigra Linn. var. **italica** Kochne.

Family ► *Salicaceae.*

Habitat ► North-western Himalaya at 900–3,700 m.

English ► Black Lombardy Poplar.

Action ► Bark and balsam from leaf bud— used for cold. Bark—depurative. Leaf bud—antiseptic, anti-inflammatory.

The bud exudate contains dimethylcaffeic acid, which was found active against herpes simplex virus type 1.

A 50% ethanol extract of a mixture of flowers and buds showed 11% inhibition of enzymatic conversion of testosterone into 5 alpha-dihydrotesterone and 4-androstene-3, 17-dione. The extract was partitioned between ethylacetate and water and the resultant ethylacetate fraction contained the active compounds, pinobanksin, demethylquercetin and pinocembrin. It exhibited 15% inhibitory activity on the enzyme. Pinocembrin was the most potent, almost equal to estradiol, which was used as a control.

The bark of all *Populus* species contains, phenolic glycosides, salicin and populin (salicin benzoate). Tannins are also present (5–9%).

Both salicin and populin cause elimination of uric acid. Salicin is antiperiodic and is used like quinine in intermittent fever, also in coryza, rheumatism and neuralgia.

Portulaca oleracea Linn.

Family ► *Portulacaceae.*

Habitat ► All over India, cultivated as a vegetable.

English ► Common Purslane.

Ayurvedic ► Brihat Lonikaa, Lonaa, Loni, Ghoddhika, Ghotikaa, Upodika, Khursaa.

Unani ► Khurfaa, Kulfaa.

Siddha/Tamil ► Pulli-keerai, Paruppukirai.

Action ► Refrigerant (reduces body heat), mild spasmodic, diuretic, antiscorbutic. Used in scurvy and in diseases of liver, spleen, kidney and bladder; also in dysuria, stomatitis and dysentery. A paste of leaves is applied to swellings, erysipelas, burns and scalds. Seeds—diuretic, antidysenteric; applied externally to burns and scalds.

A crude protein-free extract of the herb contained *l-nor*-adrenaline, dopamine and *l*-dopa, also catechol. (The fresh plant contained 2.5 mg/g *l-nor*-adrenaline in one sample.) The extract gave a strong pressor response when injected intravenously into anaesthetized dogs.

The oral administration of the homogenates of *P. oleracea* reduced the blood sugar level of alloxan-diabetic rabbits to normal.

The extract of the leaves and stems reduced muscle tone in individuals suffering from spasticity and exhibited skeletal muscle relaxant activity both *in vitro* and *in vivo*. The extract produced dose-dependent negative inotropic and chronotropic effects and pressor response on rat blood pressure.

The diuretic action of the herb is attributed to the presence of high percentage of potassium salts.

Dosage ► Plant-125–400 mg powder; juice—1–20 ml (*CCRAS.*)

Portulaca quadrifida Linn.

Family ► *Portulacaceae.*

Habitat ► Warmer parts of India, cultivated as a vegetable.

Ayurvedic ► Laghu-lonikaa.

Siddha/Tamil ► Siru Pasalai-keerai.

Action ► Similar to *P. oleracea.* Used in asthma, cough, urinary discharges, inflammations and ulcers. A poultice of the herb is applied to haemorrhoids and erysipelas.

Portulaca tuberosa Roxb.

Synonym ► *P. pilosa* Linn.

Family ► *Portulacaceae.*

Habitat ► Peninsular India, near sea-coasts.

Ayurvedic ► Bichhuu-buuti.

Folk ► Jangali Gaajar (Gujarat), Sanjivani (Bihar).

Action ► Leaves—an infusion is given internally in dysuria; externally applied to erysipelas. The herb shows diuretic, calculolythic, analgesic and antipyretic properties.

The aerial parts contain diterpenoids, pilosanone A and B.

Potentilla anserina Linn.

Family ► *Rosaceae.*

Habitat ► Western Himalayas at altitudes of 2,100–4,800 m.

English ► Silverweed.

Action ► Astringent, anti-inflammatory, antispasmodic, haemostatic. Used for diarrhoea, leucorrhoea, dysmenorrhoea, arthritis, cramps, kidney stones, bleeding piles; as a mouth wash in pyrrhoea, gingivitis and sore throat.

Key application ► In mild dismenorrhoeal disorders; as a support for treatment of milder, nonspecific, acute diarrhoea and in light inflammation of the oral and pharyngeal mucosa. (*German Commission E.*)

The plant gave anthocyanins—cyanidin and delphinidin. Aerial parts gave tannins (2–10%). The plant also gave choline, betaine, histidine, an essential oil and vitamin E.

The maximum amounts of tannins occur in the root stock (up to 17.5% on dry basis). The ethanolic and aqueous extract of the herb (1 : 5) contain 0.3 to 0.8% of tannin. The tannin fraction exhibited anti-mutagenic effect.

Potentilla fruticosa HK. (temperate Himalaya) is also used like Silverweed.

The flowers and young shoots contain flavonoids, quercetin, terniflorin, tribuloside and (−)-catechin. The plant also contains stigmasterol, beta-sitosterol and campesterol; (−)-epicatechol gallate, (±)-catechol, (−)-epicatechol, (−)-epigallocatechol and (−)-epigallocatechol gallate have been isolated from aerial parts.

Potentilla arbuscula D. Don.

Family ► *Rosaceae.*

Habitat ► Temperate Himalaya from Himachal Pradesh to Sikkim and the hills of Assam at 1,200–4,350 m.

Ayurvedic ► Bajradanti (Kumaon and Garhwal). *Potentilla fulgens* HK. is also equated with Bajradanti.

Action ► Rootstock—antidiarrhoeal; used in tooth powders for strengthening gum and teeth.

Potentilla nepalensis Hook.

Family ► *Rosaceae.*

Habitat ► The Himalayas from Kashmir to Kumaon.

Folk ► Ratanjot (substitute).

Action ► Rootstocks—depurative; ash, mixed with oil, is applied to burns.

Pothos scandens Linn.

Family ► *Araceae.*

Habitat ► Cultivated as an ornamental. Found in Bihar, North Bengal, Orissa, Western Ghats and Southwards.

Siddha/Tamil ► Aanaparuga.

Action ► Leaves—anti-inflammatory, antiseptic, antimicrobial. Applied to smallpox pustules. Root—bruised and fried in oil, applied to abscesses.

Prangos pabularia Lindl.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Kashmir and Himachal Pradesh at altitudes of 1,800–4,000 m.

Ayurvedic ► Avipriya.

Unani ► Baadiyaan-kohi, Karafs-e-kohi, Fitraasaaliyun (also equated with *Petroselinum crispum* Mill. Nym. ex auct. Kew.).

Folk ► Komal.

Action ► Root and fruit—diuretic, emmenagogue. An infusion of root is given for indigestion and irregular menses.

The roots and umbels yielded coumarins and their glycosides. Osthol (7-methoxy-8-isopentenyl-coumarin), which occurs in the dried roots up to the extent of 3.6%, has been found to be a potent respiratory and circulatory stimulant in experimental animals. Its respirotonic effect was more marked than that of coramine, leptazol and caffeine.

Premna herbacea Roxb.

Synonym ► *Pygmaeopremna herbacea* Moldenke.

Family ► *Verbenaceae.*

Habitat ► The sub-tropical Himalayas and in Assam, extending southwards through West Bengal, Bihar, Orissa into Deccan Peninsula. Roots are usually confused with those of *Clerodendrum serratum* and are sold as Bhaarangi.

Siddha/Tamil ► Siru Thekku.

Folk ► Gethiaa, Ghantu Bhaarangi. Baaman-haati (Bengal). Fruits are known as Bhuumi-jambu, Phin Jaamun. The root is known as Bhaarangamuula; in Andhra Pradesh, Gandu Bhaarangi.

Action ► Root and leaves—given in asthma, rheumatism.

The root contains several diterpenoids. Quinonemethide (bharangin) is reported from the plant.

Premna integrifolia Linn.

Synonym ► *P. obtusifolia* R. Br. *P. corymbosa* auct. non Rottl. & Willd.

Family ► *Verbenaceae.*

Habitat ► Indian and Andaman Coasts, plains of Assam and Khasi hills.

English ► Headache tree.

Ayurvedic ► Agnimantha (Kerala), Shriparni, Jayee, Ganikaarikaa, Vaataghni.

Siddha/Tamil ► Munnai

Folk ► Agethaa, Ganiyaari.

Action ► Carminative, galactagogue. The tender plant is used for neuralgia and rheumatism. A decoction of leaves is used for flatulence and colic.

Aqueous extracts of the plant showed a powerful action on the uterus and gout of the experimental animals, causing a marked increase in their activity.

The leaves contain an isoxazole alkaloid premnazole, which was found to reduce granuloma formation in rats (34.62%), its activity was comparable to phenylbutazone (35–36%).

Premnazole also reduced GPT and GOT in serum and liver. Studies suggest that premnazole acts probably by controlling the activity of the adrenocorticotropic hormone.

Dosage ► Leaf, root bark—50–100 ml decoction, powder—1–3 g. (*CCRAS.*)

Premna latifolia Roxb.

Family ► *Verbenaceae.*

Habitat ► Peninsular India, Bihar, West Bengal and North-eastern India.

English ► Dusky Fire Brand Bark.

Ayurvedic ► Agnimantha (var.).

Siddha/Tamil ► Pachumullai, Erumai munnai.

Folk ► Agethu (var.).

Action ► Leaves—diuretic, spasmolytic. Stem bark—hypoglycaemic.

The leaves gave a furanoid, premnalatin, and flavone glycosides. The stem bark gave iridoid glucosides and geniposidic acid.

Premna latifolia var. *mucronata* C. B. Clarke and *Premna barbata* Wall. are known as Bakaar and Basota (in Garhwal). These have been equated with the classical herb Vasuhatta.

Premna tomentosa Willd.

Synonym ► *Cornulia corymbosa* Lam.

Family ► *Verbenaceae.*

Habitat ► Peninsular India and Bihar up to 1,200 m.

English ► Bastard Teak.

Ayurvedic ► Agnimanth (var.).

Siddha/Tamil ► Kolakottathekku pinari, Pondanganari.

Folk ► Gineri (var.).

Action ► Bark and essential oil of root—used in stomach disorders. Leaf—diuretic, vulnerary; prescribed as a tonic after child birth; used in dropsical affections. Pounded leaves—vulnerary.

The heartwood gave apigenin derivatives. The leaves gave essential oil containing *d*-and *dl*-limonene, beta-caryophyllene a sesquiterpene hydrocarbon, a diterpene hydrocarbon and a sesquiterpene tertiary alcohol.

Primula denticulata Sm.

Family ► *Primulaceae.*

Habitat ► Temperate Himalayas from Kashmir to Bhutan and in Khasi and Jaintia hills at 1,500 m.

Folk ► Keechey (Tibet).

Action ► Root—powder used for killing leeches. Flowers—eaten in salad.

The whole plant contains several triterpenoid saponins.

Primula veris Linn., synonym *P. officinalis* Hill and *P. elatior* Hill are grown in Indian gardens.

Key application ► *Primula veris*, *P. elatior* Hill—the flower and the root in catarrhs of the respiratory tract. (*German Commission E, ESCOP.*) Contraindicated in gastritis and gastric ulcer. (*ESCOP.*)

The roots and rhizomes of *P. veris* and *P. elatior* contain a saponin, yielding a sapogenin, primulagenin A. A flavonol glycoside named primulaflavonoloside has been reported in the flowers of *P. veris.* The root of *P. veris* are considered as a substitute for Senega (*Polygala senega*) roots.

Anthocyanidins have been detected in most of the *Primula* species, also a highly toxic allergenic substance, primin, in the leaves and glandular hairs. The floral and foliar parts of the different genotypes showed presence of kaempferol, quercetin and myricetin.

Primula vulgaris Huds.

Synonym ► *P. acaulis* Hill.

Family ► *Primulaceae.*

Habitat ► Sub-Himalayan region.

English ► Primrose (Evening Primrose is equated with *Oenothera biennis*), Cowslip.

Unani ► Nakhud. (Also equated with *Cicer arietinum* by *National Formulary of Unani Medicine.*)

Action ► Plant—anti-inflammatory, vulnerary, vermifuge, emetic. Used only externally.

The plant gave phenolic glycosides, flavonoids, saponins.

Prosopis chilensis Stuntz.

Synonym ► *Prosopis juliflora* DC.

Family ► *Mimosaceae.*

Habitat ► Argentine, Arid, Mexican, Peruvian and Australian species have been introduced into India.

English ► Mesquite.

Folk ► Khejaraa, Vilaayati Kikar, Kaabuli Kikar.

Action ► Gum—inferior to Gum arabic. The dry wood contains 0.9, bark 3.0–8.4, and roots 6–7% tannin.

The leaves contain piperidine alkaloids, juliprosinene, juliflorinine and N-methyljuliforidine. Other alkaloids present in the leaves are juliprosine, *iso*juliprosine, juliflorine, julifloricine and julifloridine.

A mixture of alkaloids containing mainly juliprosine and *iso*juliprosine showed significant antifungal activity against dermatophytes (comparable to griseofulvin).

The alkaloid fraction also showed broad spectrum bactericidal action against both Gram-positive and Gram-negative bacteria (comparable to antibiotics like penicillin, streptomycin, ampicillin, sulphamethoxazole and tetracycline).

Significant activity of juliflorine against fungi and bacteria, and that of julifloricine against bacteria has also been reported.

The fruit gave a flavone glycoside, patulitrin which exhibited cytotoxic activity.

Prosopis spicigera Linn.

Synonym ► *P. cineraria* Druce.

Family ► *Mimosaceae.*

Habitat ► Dry and acrid regions of India.

Ayurvedic ► Shami, Tungaa, Keshahantri, Shankuphalaa.

Siddha/Tamil ► Kalisam.

Action ► Pod—astringent, pectoral, demulcent. Bark—anti-inflammatory, antirheumatic. Flower—administered to prevent miscarriage.

The stem bark contains vitamin K, *n*-octacosyl acetate, the long chain aliphatic acid. Presence of glucose, rhamnose, sucrose and starch is also reported.

A cytotoxic principle, patulibin, has been isolated from flowers.

Dosage ► Leaf, fruit—3–5 g powder, 50–100 ml decoction. (*CCRAS.*)

Prosopis stephaniana Kunth.

Family ► *Mimosaceae.*

Habitat ► Parts of Punjab and Gujarat.

Ayurvedic ► Samudra-shami, Shami (var.).

Folk ► Khejaraa (var.)

Action ► Pods and roots—astringent, styptic, antidysenteric.

Prunus amygdalus Batsch var. **amara** (bitter); var. **sativa** (sweet).

Family ► *Rosaceae.*

Habitat ► Cultivated in Kashmir at elevation of 760–2,400 m, also

in Himachal Pradesh and Uttar Pradesh.

English ► Almond.

Ayurvedic ► Vaataama, Vaataada.

Unani ► Baadaam Shireen, Loz.

Siddha/Tamil ► Vaadumai.

Action ► Kernels—nutritious, demulcent and stimulant nervine tonic; valuable in diets for peptic ulcer. Unripe fruits— astringent, applied to gums. Oil—nutritive, demulcent, slightly laxative.

Almond flour made from the residue left after expressing almond oil, and almond butter, is used for the preparation of starch-free diabetic food.

The chief protein of almond is a globulin, amandin, an albumin is also reported. Amandin has a high arginine content (11.9%). The primary chemical difference between the sweet and bitter kernel lies in the high content (2.5–3.5%) of amygdalin in bitter kernel; the ripe sweet almond being free of this cyanogenetic glucoside. Owing to the presence of amygdalin, which on enzymatic hydrolysis yields hydrocyanic acid, the bitter almond is not fit for human consumption.

The oil yield from bitter kernels is usually 38 to 45% and from sweet almond 44 to 55%. The bitter almond oil containing hydrocyanic acid finds limited use in medicine as an antispasmodic and sedative. Dissolved in 50 times water, it is applied externally in prurigo senilis. Hydrocyanic acid-free oil is used for flavouring purposes.

Partial replacement of saturated fatty acids with almonds lowers total plasma cholesterol and low-density lipoprotein cholesterol.

Prunus armeniaca Linn.

Family ► *Rosaceae.*

Habitat ► North-western Himalayas, particularly in the valleys of Kashmir, Chenab and Kullu, and in Simla hills at altitudes of 3,000 m.

English ► Apricot.

Ayurvedic ► Peetaalu, Aaluka, Urumaana.

Unani ► Khuubaani, Mashmash.

Action ► Powdered kernels—antitussive, antiasthmatic.

The dried apricot contains, 3,4-dihydroxybenzoic, chlorogenic and vanillic acids, quercetin, quercitrin, rutin, hyperoside and kaempferol. Apricot leaves contain quercetin, cynadin, kaempferol, caffeic acid and *p*-coumaric acid.

Prunus avium Linn.

Family ► *Rosaceae.*

Habitat ► Native to Eurasia; cultivated in Kashmir, Kumaon and Himachal Pradesh.

English ► Sweet Cherry.

Ayurvedic ► Elavaaluka, Elaya, Harivaaluka.

Folk ► Gilaas, Krusbal.

Action ► Fruit stalks—diuretic, anti-inflammatory, astringent, used for oedema, inflammation of urinary

tract, cystitis, nephritis, urinary retention.

The stems contain salicylic acid, organic acids tannins and potassium salts. Protocatechuic, *p*-coumaric, ferulic and diferculic acids have been identified in the shoots.

The fruit contains salicylates and cyanogenic glycosides, and vitamin A, B1 and C. Sugars consist mainly of glucose and fructose, with sucrose as a minor component. Malic acid is the principal acid, small amounts of citric, tartaric and succinic acids are also reported. The lipids of the fruit pulp contain *cis*-vaccenic acid.

The acetone extract of peduncle gave an isoflavone, prunetin, which on hydrolysis yielded an aglycone identified as prunetin and sugar as glucose.

The seeds contain a cyanogenic glycoside and are toxic. The bark contains tannins up to 16%.

Dosage ► Seed—3–5 g powder. (*CCRAS.*)

Prunus cerasoides D. Don.

Synonym ► *P. puddum* Roxb. ex Brandis. non-Miq.

Family ► *Rosaceae.*

Habitat ► The temperate Himalayas from Garhwal to Sikkim, also in Ootacamund.

English ► Wild Himalayan Cherry, Bird Cheery.

Ayurvedic ► Padmaka, Padmagandhi, Padmaadyaa, Padmaakha, Padmakaashtha.

Action ► Kernel—antilithic. Stem—refrigerant, antipyretic. Tender branches are crushed and soaked in water and taken internally to avert abortion. Oil—similar to that of bitter almond oil.

The plant contains a flavone glucoside, puddumin-A. The root bark contains beta-sitosterol, stigmasterol, ursolic acid, prunetinoside, glucogenkwanin and neosakuranin. Seeds contain flavonoid glycosides.

The leaves, twigs, bark and kernels contain a cyanogenetic substance.

Dosage ► Heartwood—1–3 g powder. (*API*, Vol. III.)

Prunus cerasus Linn.

Family ► *Rosaceae.*

Habitat ► Native of Eurasia; cultivated in Kashmir, Himachal Pradesh and Kumaon for edible fruits.

English ► Sour Cherry.

Ayurvedic ► Elavaaluka (var.).

Folk ► Aalu-baalu, Gilaas.

Action ► Fruit—diuretic, anti-inflammatory. Used for genitourinary inflammations, cystitis and urine retention. Bark—febrifuge, antidiarrhoeal. Fruit stalk—diuretic. Fruit stalk and stem—pectoral. Bark and fruit stalk—astringent. Kernel—nervine. Leaf—an infusion is given for convulsions in children.

Key application ► Heartwood—in skin eruptions, erysipelas, obstinate skin diseases, haemorrhagic

diseases. As a tonic for promoting conception. (*The Ayurvedic Pharmacopoeia of India.*)

The leaves, fruits and bark gave flavone glycosides. The bark contains 5–7% tannin. The kernel contains a considerable proportion of hydrocyanic acid. The leaves contain amygdalin. (Amygdalin, a nitrile glycoside, has been reported to inhibit the growth of Sarcoma-180 cells in culture.)

Prunus domestica Linn.

Synonym ▶ *P. communis* Huds.

Family ▶ *Rosaceae.*

Habitat ▶ Cultivated in Kashmir, Himachal Pradesh and Kumaon.

English ▶ Prune.

Ayurvedic ▶ Aaruka (*Prunus domestica* var. *insititia*). Aaluubukhaaraa.

Unani ▶ Aaluuchaa.

Siddha/Tamil ▶ Alpagada-pungam.

Action ▶ Fruit—refrigerant, laxative, nutritive. Improves haemoglobin levels in iron deficiency. Promotes excretion of excess calcium by the kidneys. An adjuvant for atherosclerosis and arthritis. Root—astringent.

The fruit pulp contains about 44% sugar and malic acid as major constituents. Kernel contains fixed oil about 45% and amygdalin and benzoic acid among others.

The crude extract of the fruit was found effective in controlling centrally induced emesis in dogs. The action was comparable to that of Metoclopramide (Maxolon) and chlorpromazine (Largactil).

Prunus mahaleb Linn.

Family ▶ *Rosaceae.*

Habitat ▶ Native to Europe and West Asia, introduced in India and grown as an ornamental.

English ▶ Mahaleb Cherry.

Ayurvedic ▶ Gandha-priyangu. (Priyangu is equated with *Callicarpa macrophylla* Vahl.)

Unani ▶ Mahlib, Habb-ul-Mihlab.

Folk ▶ Ghaulaa (Maharashtra).

Action ▶ Kernel—paste applied externally for treating freckles and blemishes. Contains coumarin, salicylic acid, amygdalin and hydrocyanic acid as major constituents; the oil gave alpha-elecsteric acid.

Prunus persica Batsch.

Synonym ▶ *Persica vulgaris* Nutt. *Amydgala persica* Linn.

Family ▶ *Rosaceae.*

Habitat ▶ Native to China; cultivated in Kashmir, Himachal Pradesh and Kumaon.

English ▶ Peach.

Ayurvedic ▶ Aaluka, Aaruka, Aru, Pichuka.

Action ▶ Fruit—mild tranquillizer, expectorant, diuretic, antipyretic. Bark or leaves—used as tea for

morning sickness, dry and hard cough, whooping cough and bronchitis. Leaves—used in leucoderma.

Flowers—galactagogue.

Peach seeds are a constituent of a traditional Chinese herbal drug which has been used for the treatment of gynaecological disorders such as hypermenorrhea, dysmenorrhoea and infertility.

Peach fruit extract containing nitrile glycosides, such as prunasin and amygdalin, has been reported to inhibit the growth of Sarcoma-180 cells in culture.

Fast-acting, wrinkle-eliminating cosmetic formulations contain peach kernel extract as one of the components.

The heartwood contains beta-sitosterol and its D-glucoside, hentriacontane, hentriacontanol, and the flavonoids naringenin, dihydrokaempferol, kaempferol and quercetin.

Pseudarthria viscida Wt. & Arn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Orissa throughout South India and Gujarat.

Ayurvedic ► Sanaparni, Shaalaparni (Kerala).

Siddha/Tamil ► Neermalli.

Action ► Root—astringent, febrifuge, antirheumatic. A decoction or powder is used for biliousness and diarrhoea. Used as a substitute for *Desmodium gangeticum* (Shaalaparni) in South India.

Leucopelargonidin has been isolated from the root.

Psidium guajava Linn.

Family ► *Myrtaceae.*

Habitat ► Native to Central America; cultivated chiefly in Uttar Pradesh, Punjab, Bihar, Maharashtra, and Andhra Pradesh.

English ► Guava

Ayurvedic ► Peruka (non-classical), Amaruuda.

Siddha/Tamil ► Koyya.

Action ► Unripe fruit—antidiarrhoeal. Leaves—used for dysentery, diabetes, cough and cold. Flowers—anthelmintic.

Guava juice may be helpful in regulating blood sugar in type 2 diabetes and syndrome X. (Sharon M. Herr.)

A residue obtained from methanolic fraction of unripe fruits was found to possess significant antidiarrhoeal activity. The fraction decreased gastric motility in an experimental animal model. The fraction was also found to inhibit significantly the growth of different strains of *Shigella* sp. and *Vibrio cholerae.*

In China and Taiwan, the leaf extract is administered for treating diarrhoea, dysentery, diabetes and inflammations. The leaf extract (containing quercetin) inhibits acetylcholine release in the gastro-intestinal tract which might account for us antidiarrhoeal activity. An extract of leaves with a little salt is given in relieve whooping cough.

In New Papua Guinea, decoction of new leaf tips is drunk to treat hepatitis.

Guava seed oil contains very higher proporation of linoleic acid (75.52%)

than sunflower, groundnut, olive, soybean and coconut oil. The seeds from Pakistan yield 9.25% of a fatty oil.

Vitamin C content of the ripe fruit ranges from 100 to 1000 mg/100 g. It is highest in the skin and in the flesh next to it.

Psidium cattleyanum Sabine is equated with Straberry Guava and is known as Seemai Koyya in Tamil Nadu and Pahari Payaar in Bengal. The fruit contains vitamin C 15–44 mg/100 g.

Smaller var. of Guava is equated with *Psidium guineense* Sw. It is found in Tripura.

Psoralea corylifolia Linn.

Family ► *Papilionaceae; Fabaceae.*

English ► Babchi, Purple Fleabane.

Habitat ► Rajasthan., eastern districts of Punjab and adjoining areas of Uttar Pradesh.

Ayurvedic ► Somaraaji, Somavalli, Somavallik, Soma, Chaandri, Vaakuchi, Baakuchi, Avalguja. (Somaraaji and Avalguja have also been equated with *Centratherum anthelminticum.*)

Unani ► Baabchi, Bakuchi.

Siddha/Tamil ► Karpoogaarisi.

Action ► Seed—used in leucoderma, vitiligo, leprosy, psoriasis and inflammatory diseases of the skin, both orally and externally. (*The Ayurvedic Pharmacopoeia of India.*)

The seed and roots contain chalcones, flavones, isoflavones, furanocoumarins and coumesterol group of compounds. These include psoralen, *iso*psoralen, bavachinin.

A mixture of psoralen and *iso*psoralen, in a ratio of 1:3, is recommended for topical application in leucoderma. These furanocoumarins initiate transformation of DOPA to melanin under the influence of UV light. Seeds are powdered and administered orally with warm water (5 g/day) in cases of eczema.

Psoralen was found to be cytotoxic *in vitro*. The combination therapy of psoralen and UV irradiation has been shown to inhibit the growth of tumours *in vivo*.

Bavachinin-A, isolated from the fruits, exhibited marked anti-inflammatory, antipyretic and mild analgesic properties similar to those of oxyphenylbutazone and hydrocortisone. It demonstrated better antipyretic activity than paracetamol experimentally.

Oral administration of the powdered seeds has generally resulted in side reactions (nausea, vomiting, purging); external application generally proved highly irritant to the skin.

Dosage ► Seed—1–3 g powder (*CCRAS.*); 3–6 g powder (*API,* Vol. I).

Pterocarpus dalbergioides Roxb.

Family ► *Fabaceae.*

Habitat ► The Andamans, sparingly cultivated in West Bengal.

English ► Andaman Padauk, Andaman Redwood.

Ayurvedic ► Rakta-chandana (var.).

Siddha ► Vengai (Tamil), Yerravegisa (Telugu).

Folk ► Chalangada (Andamans).

Action ► See *Pterocarpus santalinus.*

The wood contains a red pigment santalin and a yellow flavonoid santal, both of which also occur in *Pterocarpus santalinus.* The bark and the heartwood contain pterostilbene. The heartwood yields pterocarpin, liquiritigenin and isoliquiritigenin. The sapwood gave homopterocarpin additionally.

Pterocarpus indicus Willd. non-Baker, Malay Padauk, is also known as Vengai in Tamil and Yerravegisa in Telugu. A decoction of the wood is given in dropsy and for stone in the bladder. The bark-kino is used as an application for sores and a decoction of the bark or kino is used for diarrhoea.

P

Pterocarpus marsupium Roxb.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout the tropical zones of India in the hilly regions.

English ► Indian Kino tree, Malabar Kino tree.

Ayurvedic ► Asana, Bijaka, Priyaka, Pitashaala.

Unani ► Bijaysaar.

Siddha/Tamil ► Vengai.

Action ► Bark-kino—astringent, antihaemorrhagic, antidiarrhoeal. Flowers—febrifuge. Leaves—used externally for skin diseases.

Key application ► Heartwood—in anaemia, worm infestation, skin diseases, urinary disorders, lipid disorders and obesity. Stem bark—in diabetes. (*The Ayurvedic Pharmacopoeia of India.*)

The heartwood and roots contain isoflavonoids, terpenoids and tannins. Tannins include the hypoglycaemic principle (−)-epicatechin. Stilbenes, such as pterostilbene; flavonoids, including liquiritigenin, *iso*liquiritigenin, 7-hydroxyflavanone, 7,4-dihydroxyflavanone, 5-deoxykaempferol and pterosupin; a benzofuranone marsupsin and propterol, *p*-hydroxy-benzaldehyde are active principles of therapeutic importance.

The gum-kino from the bark provides a non-glucosidal tannin, Kino tannic acid (25–80%).

The (−)-epi-catechin increases the cAMP content of the islets which is associated with the increased insulin release, conversion of proinsulin to insulin and cathepsin B activity.

Oral administration of ethylacetate extract of the heartwood and its flavonoid constituents, marsupin, pterosupin and liquiritigenin, for 14 consecutive days to rats exhibited a significant reduction of serum triglycerides, total cholesterol and LDL- and VLDL-cholesterol levels, but it did not exert any significant effect on HDL-cholesterol.

The ethanolic and methanolic extracts of the heartwood exhibited significant *in vitro* antimicrobial activity against Gram-positive and Gram-negative bacteria and some strains of fungi.

Kino is powerfully astringent. The therapeutic value of kino is due to Kino tannic acid.

Dosage ► Heartwood—50–100 g for decoction. (*API,* Vol. I); stem bark—32–50 g for decoction (*API,* Vol. III).

Pterocarpus santalinus Linn. f.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Found in Cuddaph district of Andhra Pradesh, neighbouring areas of Tamil Nadu and Karnataka.

English ► Red Sandalwood, Red Sanders.

Ayurvedic ► Raktachandana, Raktasaara.

Unani ► Sandal Surkh.

Siddha/Tamil ► Shivappu chandanam.

Folk ► Laal-chandan.

Action ► Heartwood—antibilious, anti-inflammatory, hypoglycaemic, astringent, diaphoretic, febrifuge.

A paste of wood is used externally for inflammations and headache. Fruit—antidysenteric

The heartwood contains terpenoids—eudesmol, *iso*-pterocarpolone, pterocarpol, cryptomeridiol, pterocarptriol and pterocarpdiolone; pigments santalins A and B. The bark contains triterpenoids—beta-ampyrone, lupenone and lupeol derivatives. The sapwood gave acetyl oleanolic aldehyde, acetyl oleanolic acid and erythrodiol.

An ethanolic extract (95%) of the wood powder was found effective in lowering blood sugar levels in fasting, fed, glucose-loaded and streptozotocin diabetic models in rats.

A cream prepared from the methanolic extract of the heartwood of Red Sandalwood and rhizomes of *Curcuma longa* showed 95.46% inhibition of oedema in combination (*Curcuma longa* and red sandalwood showed 65.62 and 64.14% inhibition respectively, when used individually).

A decoction of the heartwood produced potentiation of pentobarbitone-induced hypnosis in albino mice; blocked conditioned avoidance response in rats and showed anticonvulsant and anti-inflammatory activities.

Dosage ► Heartwood—3–6 g powder. (*API,* Vol. III.)

Pterospermum acerifolium Willd.

Family ► *Sterculiaceae.*

Habitat ► Maharashtra, Manipur, North Bengal, Bihar and Assam, Western Ghats and Andaman Islands.

English ► Hathipaila.

Ayurvedic ► Muchukunda, Muchakunda, Kshatravriksha, Chivuka, Prativishnuka, Muchukunda Champaa. Karnikaara (also equated with *Cassia fistula*).

Unani ► Gul-e-Muchkun.

Siddha/Tamil ► Vennangu.

Action ► Flower—anti-inflammatory, styptic (used for bleeding piles, haematuria, ulcers). Charred

flowers and bark, mixed with the powder of *Mallotus philippinensis,* are applied to smallpox eruptions.

The fresh flowers yielded kaempferol-3-O-beta-D-galactoside, along with luteolin and its 7-O-glucoside. The leaves also contain betulin, lupeol, bauerenol, friedelin and beta-sitosterol.

Dosage ► Flower—3–6 g powder. (*CCRAS.*)

Pterospermum canescens Roxb.

Synonym ► *P. suberifolium* Lam. non-Roxb.

Family ► *Sterculiaceae.*

Habitat ► Karnataka and Tamil Nadu, occasionally planted in West Bengal.

Ayurvedic ► Muchukunda (var.)

Siddha/Tamil ► Sempulavu.

Action ► Flowers—anodyne; a paste with rice-water and vinegar is used externally in migraine. Leaves—applied externally in headache.

Flowers gave arachidic, linoleic, myristic, oleic, palmitic and stearic acids and beta-sitosterol, kaempferol-3-beta-D-galactoside and kaempferol-3-rutinoside. The flavonoids present in the leaves are kaempferol-3-beta-D-galactoside, kaempferol, quercetin and its 3-O-arabinoside and 3-O-rhamnoside. The leaves also contain betulin, beta-amyrin, lupeol, bauerenol, friedelin, taraxerone and beta-sitosterol.

Pueraria lobata (Willd.) Ohwi.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Eastern Himalayas, Assam and Khasi Hills.

English ► Tropical Kudze.

Ayurvedic ► Vidaari (var.).

Action ► Root—antipyretic, anti-inflammatory, spasmolytic. Flower—hepatoprotective.

The root of *P. lobata* is used in Chinese medicine as an antipyretic and spasmolytic agent.

The root contains pueraria glycosides and puerarol. The glycosides showed strong antioxidant activity and inhibited lipid peroxidation. The root also contain several flavones which showed 66.8% inhibition against stomach cancer *in vivo* in mice. The isoflayvonoids, daidzein, formononetin, daidzin and puerarin. Daidzein and puerarin show significant anti-inflammatory activity.

The cosmetics containing the root extracts with 20–40% puerarin and 20–45% sugars (as sucrose) are used as moisturizing, skin-lightening and sun-screening and hair-growth stimulating preparations.

An isoflavonoid, triterpenoid saponin and tryptophan derivative isolated from the flowers showed protective effect against experimental liver injuries in mice.

The tryptophan derivatives and their glycosides exhibited antihyperglycaemic activity.

Pueraria phaseoloides (Roxb.) Benth., synonym *P. javanica* Benth. (Sub-Himalayan regions; Assam, An-

dhra Pradesh, Tamil Nadu and Kerala, up to 1,100 m) is equated with Tropical Kudze. The plant is used against ulcers and boils.

Pueraria tuberosa DC.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Punjab, Western Uttar Pradesh, Central India.

English ► Indian Kudze.

Ayurvedic ► Vidaari, Swaadukandaa, Ikshugandhaa, Gajavaajipriyaa, Kandapalaasha, Bhuumikushmaanda. (Substitute for Jivaka and Rshabhaka.)

Folk ► Bhui-kumhadaa, Suraal.

Action ► Tuber—diuretic, cardiac tonic, galactagogue. Also used for fertility control. Root—used as a demulcent, and refrigerant in fevers, as cataplasm for swelling of joints, as galactagogue.

The butanolic extract of *Pueraria tuberosa* showed significant protection against hepatic damage in rats. The ethanolic extract of the tubers and its butanol and pre-puerarin fractions exhibited anti-implantation effect. The pure compounds, puerarin, daidzein and tuberosin, exhibited significant anti-implantation activity in hamsters.

In Indian medicine, Vidaari and Kshira-vidaari are used for promoting breast milk and semen, and as a restorative tonic. Most authors have equated Vidaari with *Pueraria tuberosa* and Kshira-vidaari with *Ipomoea digitata.*

In Western herbal, *Pueraria lobata* and *P. tuberosa* roots are used alone or in combination with other products for symptoms due to alcoholism. But preliminary research shows that Kudze does not improve sobriety in chronic alcoholics. (*Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Tuber—3–5 g powder. (*CCRAS.*)

Pulicaria dysenterica Bernh.

Family ► *Asteraceae.*

Habitat ► Kashmir at 1,500–1,800 m.

Action ► Plant—astringent, diuretic. Root—antidiarrhoeal. Leaf—antiasthmatic.

Punica granatum Linn.

Family ► *Punicaceae.*

Habitat ► Native to Iran; but cultivated throughout India.

English ► Pomegranate.

Ayurvedic ► Daadima, Daadimba, Raktapushpa, Dantabijaa, Raktakusumaa, Lohitpushpaka.

Unani ► Anaar, Roomaan, Gulnaar, Gulnaar Farsi.

Siddha/Tamil ► Maathulai.

Action ► Rind of fruit—astringent, stomachic, digestive. Used for diarrhoea, dysentery, colitis, dyspepsia and uterine disorders. Leaf—used in stomatitis (recommended by *The Ayurvedic Pharmacopoeia of India*). Fresh juice of fruit—refrigerant,

cosive, antiemetic; given as an adjuvant in diarrhoea, dyspepsia, biliousness, inflammations of the stomach, palpitation, excessive thirst and fevers. Bark of stem and root—anthelmintic, febrifuge. Given for night sweats. Rind of fruit, bark of stem and root—antidiarrhoeal. Powdered flower buds—used in bronchitis.

The fruit rind (dried) contains up to 26, stem bark 10–25, root bark 28 and leaves 11% tannin.

The rind gave an ellagitannin (granatin B, leaves gave granatins A and B and punicafolin); punicalagin, punicalin and ellagic acid. Pentose glycosides of malvidin and pentunidin have also been isolated from the rind. Rind extract showed significant hypoglycaemic activity in mildly diabetic rats.

P

Seeds gave malvidin pentose glycoside.

Flowers gave pelargonidin-3,5-diglucoside; also sitosterol, ursolic acid, maslinic acid, asiatic acid, sitosterol-beta-D-glucoside and gallic acid.

Extracts of the whole fruit were highly active against *Micrococcus pyogenes* var. *aureus, E. coli* and *Pseudomonas aeruginosa;* also very effective against intestinal pathogenic bacilli.

Aqueous extract of the root was found to inhibit the activity of *Mycobacterium tuberculosis* 607.

The proanthocyanidins of pomegranate showed hypolipidaemic activity by their ability to enhance resistance of vascular wall preventing penetration of cholesterol into atherogenic lipoproteins.

Putranjiva roxburghii Wall.

Synonym ► *Drypetes roxburghii* (Wall.) Hurusawa.

Family ► *Euphoriaceae.*

Habitat ► Throughout tropical India, wild and cultivated as an avenue tree.

English ► Child-life tree, Indian Amulet Plant, Spurious Wild Olive.

Ayurvedic ► Putranjiva, Putrajivaka, Putrajiva, Yashtipushpa, Arth-saadhana

Siddha/Tamil ► Karupali Garbhadaa and Garbhakaraa are misleading synonyms.

Folk ► Jiyaapotaa.

Action ► Fruit—powered (de-seeded) fruits are used against cough, cold and sprue. Rosaries of hard stones are used for protecting children from infections. (Due to misleading nomenclature, the "conception-promoting" property has been attributed to the drug in folk medicine. Its use is possible in vaginal infections and genitourinary diseases, or skin eruptions during pre-conception stage.)

The seed kernel on steam distillation yield 0.5% of a sharp-smelling essential oil of the mustard oil type. The oil contains isopropyl and 2-butyl isothiocyanates as the main constituents and 2-methyl-butyl isothiocyanate as a minor component. The iso-thiocyanates are produced on enzymic hydrolysis of glycosidic progenitors present in the kernels, *viz.* glucoputranjivin, glucocochlearin and glucojiaputin respec-

tively. An additional glucoside, glucocleomin has been identified in the seed kernel, it affords a non-volatile mustard oil, cleomin. A glycosidic pattern similar to that in the seed is reported in the shoots and roots.

The fruit pulp contains a large proportion of mannitol and small quantities of saponin glucosides and alkaloids.

The seed coat gave putranjivoside, putranoside A, B, C and D, beta-sitosterol and tis beta-D-glucoside.

The leaves gave amentoflavone and its derivatives, beta-amyrin and its palmite, polyphenols, putranjiva saponin A,B,C, and D and stigmasterol.

The bark contains friedelin, friedelanol, friedelanone, friedelan-3,7-dione (putranjivadione), 3-alpha-hydroxy friedelan- 7-one (roxburgholone), carboxylic acid, putric acid, putranjivic acid.

The essential oil from leaves showed mild antifungal activity against *Rhizoctonia solani.*

Pygmaeopemna herbacea (Roxb.) Mold.

Synonym ► *Premna herbacea* Roxb.

Family ► *Verbenaceae.*

Habitat ► Andhra Pradesh, Tamil Nadu and Orissa and in some parts of Kerala.

Ayurvedic ► Bhumi-jambu.

Siddha/Tamil ► Siru Thekku.

Action ► Rootstock—antiasthmatic. Leaf— bechic, febrifuge. Rootstock and leaf—antirheumatic. (Sold in South Indian market as Bhaarangi.)

A diterpenoid quinonemethide (bharangin) is reported from the plant.

Pyrola rotundifolia Linn.

Family ► *Pyrolaceae.*

Habitat ► North-Western and eastern Himalaya at altitudes of 2,700–3,000 m. and in Khasi and Jaintia hills up to 1,500 m.

Action ► Plant—astringent and antilithic. Used for healing wounds. A decoction of the plant is prescribed against profuse menses, bloody stools, haemorrhages and ulcers in urinary passages. The whole herb is used in traditional chinese medicine for the treatment of arthritis.

The plant contains ursolic acid, chimaphilin, hyperin, quercetin, myricetin and gallic acid. Chimaphilin and ursolic acid inhibit carrageenan-induced oedema in rat paw. Other constituents act as protective antioxidants.

Pyrus communis Linn.

Family ► *Rosaceae.*

Habitat ► Distributed in the temperate regions of Europe and West Asia. Grown in Punjab and Kashmir.

English ► Common or European Pear.

Folk ► Bagu-goshaa, Babbu-goshaa.

Action ► Fruits—a good source of pectin, help in maintaining a desirable acid balance in the body. Recommended to patients suffering from diabetes because of low sucrose content; and included in low antigen content diets to alleviate the symptoms in the management of immune-mediated disease.

Fresh pear juice exhibited good activity against *Micrococcus pyogenes* var. *aureus* and *Escherichia coli.*

An aqueous extract of the leaves was active against some strains of *E. coli.*

The leaves contain arbutin, *iso*-quercitrin, sorbitol, ursolic acid, astragalin and tannin (0.8–2.9%). The bark contains friedelin, epifriedelanol and beta-sitosterol. Phloridzin is present in the root bark.

The plant extract controls the development of freckles and blemishes on the skin and prevents melanin formation. It finds application in skin-lightening creams.

Q

Quassia indica Nooteboom.

Synonym ► *Samadera indica* Gaertn.
S. indica var. lucida Blatter.
S. lucida Wall.

Family ► *Simaroubaceae.*

Habitat ► West Coast, along back waters and evergreen forests from Maharashtra southwards to Trivandrum.

English ► Niepa Bark tree.

Siddha/Tamil ► Nibam, Niepa, Karinjottei.

Folk ► Lokhandi (Maharashtra).

Action ► Bark—febrifuge; juice applied to skin diseases. An infusion of wood and bark is given as emmenagogue. Seed—emetic, purgative; used for bilious fevers. Seed oil—applied in rheumatism. Leaves— externally in erysipelas.

The bark contains the quassinoids, indaquassin, A, D, E and F; samaderine B to E, dihydrosamaderine B, brucein D, soulameolide, cedronin and canthin-2, 6-dione.

Brucin D showed activity against Walker's carcinoma. Samaderine E, isolated from the plant, exhibits antileukaemic activity.

Quercus ilex Linn.

Family ► *Fagaceae.*

Habitat ► The Himalayas, from the Sutlej valley westwards and in Kashmir at altitudes of 900–2,600 m.

English ► Holly or Holm Oak.

Ayurvedic ► Maayaaphala (var.) (galls).

Action ► Leaves—antioxidant. Galls—contain 41% tannin. The bark contains 7–13%; leaves 2.1% tannin and 1.8% non-tannin.

The leaves contain alpha-tocopherol as main antioxidant. The mature leaves contain proanthocyanidins 3.3, and leucoanthocyanidins 3.4 mg/g (on dry matter basis).

Quercus incana Roxb.

Synonym ► *Q. leucotrichophora* A. Camus ex Bhadur.

Family ► *Fagaceae.*

Habitat ► Kashmir and Western Himalayas up to Nepal at altitudes of 1,000–2,400 m.

English ► Grey Oak.

Unani ► Baloot.

Folk ► Shilaa Supaari (Kashmir), Phanat (Garhwal), Shiddar (Kashmir).

Action ▶ Acrons—diuretic, astringent. Used in indigestion and diarrhoea (after removing tannin and associated substances by the process of germination under earth). Also used in gonorrhoea.

The bark contains 6–23% of tannin. The stem bark contains friedelin, a triterpenoid, beta-sitosterol and a mixture of leucoanthocyanidins (including leucopelargonidin). Leaves contain flavonoids— quercetin, quercetin-3-galacto-arabinoside.

The kernels gave fatty acids, including palmitic, lignoceric and oleic.

Quercus infectoria Oliv.

Family ▶ *Fagaceae.*

Habitat ▶ Indigenous to Greece, Syria and Iran. Yields oak galls.

English ▶ Oak galls, Aleppo galls, Mecca galls.

Ayurvedic ▶ Maajuphalaka, Maayaaphala, Maayakku.

Unani ▶ Maazu. Maaphal.

Siddha/Tamil ▶ Maasikkaai.

Action ▶ Astringent. Bark and fruits—used for eczema and impetigo. Galls—used for diseases of gums and oral cavity (diluted with toothpowder or paste; also as a gargle in nasal catarrh and sore throat. An ointment (1 in 4 parts of vaseline) is applied externally in haemorrhoids. Also included in breast and vaginal firming creams. A decoction of galls is used as an enema in prolapus of rectum.

Key application ▶ Quercus robur L. bark—externally, in inflammatory skin diseases; internally in non-specific, acute diarrhoea, and local treatment of mild inflammation of the oral cavity and pharyngeal region, as well as of genital and anal area. (*German Commission E.*)

The Ayurvedic Pharmacopoeia of India recommends the gall in leucorrhoea, dry and itching vagina; topically for dental inflammations.

The fruits gave amentoflavone hexamethyl ether, isocryptomerin and beta-sitosterol.

The alcoholic extract of fruits showed 36% liver protection against carbon tetrachloride-induced toxicity at a dose of 800 mg/kg.

The galls contain 50–70% gallo tannic acid, gallic acid 2–4%, ellagic acid, nyctanthic acid, rubric acid, besides sugars, starch, an essential oil and anthocyanins. Galls were also found to contain beta-sitosterol, amentoflavone, hexamethyl ether and isocryptomerin.

Quercus robur (English or European oak) is reported to be cultivated in Nilgiris. The bark contains 15–20% tannins consisting of phlobatannin, ellagitannins and gallic acid.

The bark is contraindicated in cardiac insufficiency and hypertonia; externally on broken skin. (Sharon M. Herr.)

Dosage ▶ Gall—1–3 g powder. (*API*, Vol. IV.)

Quillaja saponaria Molina.

Family ▶ *Rosaceae.*

Habitat ► Indigenous to Chile and Peru; introduced in India in Ootacamund.

English ► Soap Bark, Quillaia Bark.

Action ► Bark—cutaneous stimulant. Its liquid extract is used as a lotion for certain skin diseases of the scalp, and in antiulcer preparations.

The detergent and medicinal properties of quillaia are due to the presence of haemolytic saponins (9–10%) of which quillaia-saponin (which yields glucuronic acid and quillaic acid, a sapogenin, on hydrolysis) is most important.

Quillaja extracts caused marked swelling and haemorrhage in stomach and small intestines of mice after 24 hours.

An isolated saponin (QS-21) from the bark shows evidence that it might augment both antibody and cell-mediated immune response, significantly increasing antibody levels. (*Natural Medicines Comprehensive Database,* 2007.)

Quisqualis indica Linn.

Family ► *Combretaceae.*

Habitat ► Native to Java and Malaysia; cultivated in Indian gardens.

English ► Rangoon Creeper.

Ayurvedic ► Rangoon-ki-Bel.

Siddha/Tamil ► Irangunmalli.

Folk ► Laal-chameli.

Action ► Fruits and seeds—anthelmintic (particularly against ascarites and soporific). Seeds—soporific. Ripe seeds are roasted and given in diarrhoea and fever. Macerated in oil, are applied to parasitic skin diseases. Leaves—decoction prescribed in abdominal pain.

The leaves and flowers gave rutin and pelargonidin-3-glucoside, quisqualic acid, trigonelline, L-proline and L-asparagine.

Quisqualic acid showed anthelmintic activity. Seeds gave arachidic, linoleic, oleic, palmitic and stearic acids.

Q

R

Radermachera xylocarpa (Roxb.) K. Schum.

Synonym ► *Bignonia xylocarpa* Roxb. *Stereospermum xylocarpum* (Roxb.) Wt.

Family ► *Bignoniaceae.*

Habitat ► Gujarat, Karnataka, Tamil Nadu.

English ► Padri tree.

Siddha/Tamil ► Vedanguruni, Pathiri.

Folk ► Paadiri. Kharsing, Kadashing, Bairsinge (Maharashtra).

Action ► Plant—antiseptic. Resin—used for the treatment of skin diseases. Rootbark—bitter, astringent; used as substitute for *Stereospermumpersonatum* (Hassk.) D. Chatterjee and *S. suaveolens* DC. (Trumpet-Flower, Yellow Snake tree, also known as Padri).

The leaves gave flavonoids, dinatin and its glycoside. Roots yielded O-acetyl oleanolic acid, stigmasterol and a red pigment, radermachol.

Randia dumetorum Poir.

Synonym ► *R. spinosa* Poir.
R. brandisii Gamble.
R. longispina W. & A.
R. tomentosa W. & A. non Blume.
Xeromphis spinosa Keay.

Family ► *Rubiaceae.*

Habitat ► Assam, Naga and Khasi Hills, Travancore and the Andamans.

English ► Common Emetic Nut.

Ayurvedic ► Madana, Chhardana, Pindi, Shalayaka, Vishapushpaka.

Unani ► Mainphal, Jauz-ul-Qai.

Siddha/Tamil ► Marukkaaraikai, Madkarai.

Folk ► Mainphal.

Action ► Fruit—nervine, calmative, antispasmodic, emetic, anthelmintic, abortifacient. Used as a substitute for ipecacuanha.

The Ayurvedic Pharmacopoeia of India recommends the dried fruit in chlorosis, common cold, rhinitis and obstinate skin diseases.

The activity of the drug is attributed to the presence of saponins which occur to the extent of 2–3% in fresh fruits and about 10% in dried whole fruit. The saponins are concentrated mostly in the pulp. A mixture of two saponins, *viz.* randialic or neutral saponin and randialic acid or acid saponin has been isolated from the pulp. On complete hydrolysis both the saponins yield oleanolic acid as sapogenin. Ursosaponin, isolated from the ethanolic extract of the dried whole fruit, gave ursolic acid and glucose. Randianin, isolated from the fruit, gave a haemolytic triterpenoid saponin.

In experimental animals, the drug caused haemolysis both *in vitro* and *in vivo*. Crude saponin fraction showed haemolytic, molluscidal and immunostimulating activities.

Oleanolic acid 3-glucoside, isolated from the seed, exhibited anti-arthritic activity in exudative and proliferative phases of inflammation in rats.

Dosage ► Fruit—0.5–1.0 g powder for decoction, 3–6 g for induction vomiting. (*API,* Vol. I.)

Randia uliginosa DC.

Synonym ► *Catunaregam uliginosa* (Retz.) Sivarajan.

Family ► *Rubiaceae.*

Habitat ► Southern, Central and Eastern India, including Assam and Sikkim.

Ayurvedic ► Pindaalu, Pinditaka.

Siddha/Tamil ► Wagatta, Perunkarai.

Folk ► Mainphal, Pindaar, Pendraa, Pendhar.

Action ► Unripe fruit—astringent. Root—diuretic; used for biliousness, diarrhoea and dysentery.

Unripe fruits are roasted and used as a remedy for dysentery and diarrhoea. The root, boiled in purified butter, is also prescribed for dysentery and diarrhoea.

The fruits, like those of *Randia spinosa,* contain a toxic saponin of oleanolic acid. They also contain leucocyanidin and mannitol. The flowers yield an essential oil similar to Gardenia oil.

Ranunculus arvensis Linn.

Family ► *Ranunculaceae.*

Habitat ► The Western Himalayas from Kashmir to Kumaon.

English ► Corn Buttercup.

Folk ► Chambul (Punjab). Gagerkanda (Kashmir).

Action ► Used in intermittent fevers, asthma and gout.

The active principle of the herb is protoanemonin (0.54%) and its glycosidic precursor, ranunculin. The herb yields hydrocyanic acid in very small amounts.

The leaves contain the antifungal lactone protoanemonin which inhibited growth of *Epidermophyton floccosum* and the yeast *Rhodotorula glutinis.*

Ranunculus sceleratus Linn.

Family ► *Ranunculaceae.*

Habitat ► The plains of northern India, and the warm valleys of the Himalayas from Kashmir to Assam.

English ► Blister Buttercup, Celery-leaved Crowfoot.

Ayurvedic ► Kaandira, Kaandakatuka, Naasaa-samvedana, Toyavalli, Sukaandaka.

Folk ► Jal-dhaniyaa.

Action ► Fresh Plant—highly acrid, rubefacient, vesicant and toxic;

causes inflammation of the digestive tract. Used after drying or as a homoeopathic medicine for skin diseases.

The plant contains anemonin, protoanemonin, ranunculine, serotonin and other tryptamine derivatives.

Serotonin (5-hydroxytryptamine) is a potent vaso-constrictor. Protoanemonin possesses strong antibacterial, antiviral, cytopathogenic and vermicidal properties, and is effective against both Gram-positive and Gram-negative bacteria, similar to penicillic acid. It inhibits the growth of *E. coli, Staphylococcus aureus* and *Candida albicans.* It inactivates *in vitro* diptheria toxin.

Dosgae ► Whole plant—1–3 g powder. (*CCRAS.*)

Ranunculus trichophyllus Chaix.

Synonym ► *R. aquatilis* Linn. var. *capillaceus* DC.

Family ► *Ranunculaceae.*

Habitat ► Kashmir to Sikkim.

English ► Water Crowfoot, Water Fennel.

Ayurvedic ► Kaandira (var.).

Folk ► Tohlab (Kashmir).

Action ► Herb—used in intermittent fevers, rheumatism and asthma.

Ranunculus muricatus Linn. (Punjab and Kashmir) is used in intermittent fevers, gout and asthma in Europe. The herb is rubefacient, vesicant and narcotic.

Raphanus sativus Linn.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► Cultivated in Uttar Pradesh, Punjab, Maharashtra and Gujarat.

English ► Radish.

Ayurvedic ► Muulaka, Laghumuulaka, Muulakapotikaa, Visra, Shaaleya, Marusambhava. Pods—Sungraa, Singri, Mungraa.

Unani ► Muuli, Turb Fajal.

Siddha/Tamil ► Mullangi.

Action ► Radish—preparations are used in liver, gallbladder and urinary complaints. Green leaves—diuretic and carminative. Seeds—diuretic, purgative, expectorant.

A decoction of dry radish is given orally in piles. Extract of the dry root is given for hiccough, influenza, dysentery, colic and urinary troubles.

Key application ► In peptic disorders, especially those related to dyskinesia of the bile ducts; and in catarrhs of the upper respiratory tract. (*German Commission E.*)

The Ayurvedic Pharmacopoeia of India recommends the juice of the whole plant in sinusitis; juice of the root in diseases of the throat and sinusitis; and the seed in amenorrhoea, cough and dyspnoea.

The fleshy root and seeds contain trans-4-methyl-thiobutenyl isothiocyanate glucoside (the pungent principle), cyanidin-5-glucoside-3-sophoro-

side, pelargonidin diglycoside, cyanidin diglycoside, 5-methyl-L-cysteine-sulphoxide (methiin), steroidal sapogenins and sulphorophene.

The enzymes present in the radish are phosphatase, catalase, sucrase, amylase, alcohol dehydrogenase and pyruvic carboxylase.

Radish contains caffeic acid and ferulic acid which exhibit hepatoprotective and choleretic properties. It contains choline which prevents deposition of fat in liver. Amino acids, ornithine, citrulline, arginine, glutamic acid and asparatic acid remove toxins from the body and urea acumulation.

Radish is a good source of ascorbic acid (15–40 mg/100 g), trace elements include aluminium, barium, lithium, manganese, silicon, titanium, also iodine (upto 18 mcg/100 g) and ascorbigen.

Roots, leaves, flowers and pods are active against Gram-positive bacteria.

The seeds are reported to contain a broad spectrum antibiotic, machrolysin, specific against *Mycobacterium tuberculosis*. Raphanin, extracted from the seeds, is active against Gram-positive and Gram-negative bacteria.

A purified basic protein, homologous to nonspecific lipid transfer proteins, from seeds showed antifungal activity.

Raphanus caudatus Linn., synonym *R. sativus* var. *caudatus,* is known as Rat-Tail Radish.

A native to Java, it is cultivated in northern and western India. The root is not used; pods, purple or violet in colour, are consumed for properties attributed to *Raphanus* sp. These are known as Mungraa or Sungraa.

Dosage ► Whole plant—20–40 ml juice; root—15–30 ml juice. (*API,* Vol. II.) Seed—1–3 g powder. (*API,* Vol. III.)

Rauvolfia serpentina
Benth. ex Kurz.

Family ► *Apocynaceae.*

Habitat ► The sub-Himalayas tract from Punjab to Nepal, Sikkim, Bhutan, Assam, Western Ghats and the Andamans.

English ► Rauvolfia root, Serpentina Root, Indian Snakeroot.

Ayurvedic ► Sarpagandhaa of Ayurvedic texts was not the Sarpagandhaa of modern medicine. (Sarpagandhaa was equated with Naakuli, Sarpachhatrikaa and Varshaasu Chhatrikaaraa. Sarpagandhaa and Sarpasugandhaa were synonyms of Naakuli.)

Folk ► Chhotaa Chaand.

Action ► Root—decoction is employed to increase uterine contractions and for expulsion of foetus in difficult cases. The total alkaloidal extract of the root induces bradycardia, hypotension, sedation. It finds application in hypochondria, neuropsychiatric disorders, psychosis and schizophrenia.

Key application ► In mild, essential hypertension (borderline hypertension, especially with elevated tension of the sympathetic nervous system, for example,

R

sinus tachycardia, anxiety, tension and psychomotor irritation, when dietetic measures alone are not sufficient. (*German Commission E.*)

(Average daily dose: 600 mg drug corresponding to 6 mg total alkaloid.) Treatment is usually administered with a diuretic to prevent fluid retention which may develop if Rauvolfia root is given alone. (*WHO.*) Contraindicated in depression, bleeding disorders, gastric and duodenal ulcers. (Sharon M. Herr.) Also contraindicated in pregnancy, since it has both teratogenic and abortifacient potential. (Francis Brinker.)

The root and root bark are rich in alkaloids, the most important being reserpine, others, around 30, which include ajmaline, ajmalicine (raubasine), ajmalicine, yohimbine, coryanthine, iso-ajmaline, neo-ajmaline, papaverine, raubasine, rauwolscine, rescinnamine, reserpine, sarpagine, serpentine, serpentinine, serpinine and deserpidine.

Reserpine is hypotensive and tranquilizer, used for certain forms of mental disorders. Ajmalicine (raubasine) and rescinnamine are also hypotensive and tranquilizer. Deserpidine is sedative, as well as hypotensive. Ajmaline exhibits antiarrhythmic activity.

A number of Rauvolfia species are found in India: *R. beddomei* Hook. *f.; R. densiflora* Benth ex Hook. f. (Himalayas, Khasi and Aka Hills; Western and Eastern Ghats); *R. micrantha* Hook. f; known as Malabar Rauvolfia, (Kerala, up to an altitude of 300 m)

The roots of *R. beddomei* contain ajmalicine, sarpagine and serpentine, but no reserpine. *R. densiflora* yielded 0.51% of total alkaloids (reserpine 0.01%). *R. micrantha* gave ajmalicine, raunamine, reserpiline, sarpagine, neosarpagine, in addition to reserpine.

(In classical Ayurvedic texts, Nakuli and Gandha-naakuli were included in compound formulations for mental diseases.)

Rauvolfia tetraphylla Linn.

Synonym ► *R. canescens* L.

Family ► *Apocynaceae.*

Habitat ► Abundant in moist and warm regions of West Bengal, particularly in 24 Parganas and Howrah, and Kerala (as a weed).

Folk ► Badaa Chaand.

Action ► Root—sedative, hypotensive. Plant juice, mixed with castor oil, is applied to skin diseases and to destroy parasites.

The plant contains a number of alkaloids, including rauvolscine, ajmalicine, canescine, reserpine, pseudoyohimbine; yohimbine, corynanthene, raunescine, iso-raunescine and recanescine.

The major alkaloid is rauwolscine (alpha-yohimbine), present in the root bark (0.1%), stem bark (0.2%) and leaves (0.5%).

The roots are often used as a substitute or adulterant of those of *R. serpentina,* though the reserpine content of the dried root was found to be comparatively low (0.03–0.05%).

Reinwardtia indica Dum.

Family ► *Linaceae.*

Habitat ► The Himalayas from Kashmir to Sikkim; commonly grown in gardens.

English ► Winter-Flax, Yellow Flax.

Ayurvedic ► Baasanti.

Folk ► Abai (Maharashtra).

Action ► Plant—used for the treatment of paralysis in Bihar. The crushed leaves and stems are applied to wounds infested with maggots.

Reissantia grahamii (Wight) Ding Hou.

Synonym ► *Hippocratea grahamii* Wight.
Pristimera grahamii A. C. Smith.

Family ► *Celastraceae; Hippocrateaceae.*

Habitat ► Konkan, and the South Andamans.

Folk ► Danshir, Daushir, Lokhandi, Yesti, Zerwati (Maharashtra).

Action ► Root—used for the treatment of respiratory affections, common cold and influenza.

The roots contain about twice the amount of pristimerin as in *R. indica* and show similar antibiotic properties. Pristimerin is found active against *Streptococcus viridans,* causative organism for sore throat and tonsilitis, and *S. pyogenes.*

Reissantia indica Halle.

Synonym ► *Hippocratea indica* Willd.
Pristimera indica A. C. Smith.

Family ► *Celastraceae; Hippocrateaceae.*

Habitat ► North-eastern India.

Siddha/Tamil ► Odangod.

Folk ► Kazurati, Tirruli (Maharashtra), Atari-lataa, Kathapahaariaa, Lokhandi (Bengal).

Action ► Root bark—used for the treatment of respiratory troubles. Stem—febrifuge. Leaves—scorched and given to women during confinement. Powdered leaves and roots are applied to sores and wounds.

The roots contain dulcitol. The root bark contains an antibiotic principle, pristimerin (0.1%) which shows considered *in vitro* activity against several Gram-positive *cocci,* both haemolytic and non-haemolytic. Pristimerin also inhibits *in vitro* growth of different strains of *Mycobacterium tuberculosis.* Clinical trials have shown that pristimerin is effective in the treatment of inflammatory conditions of the naso-pharyngeal mucosa resulting from common cold and influenzal infections. It is found useful as an adjunct to the common antibiotic therapy of respiratory inflammations of both bacterial and viral origin, and is reported to possess antitumour properties, but its high toxicity precludes its use as a cancero-static agent.

Remusatia vivipara Schott.

Family ► *Araceae.*

Habitat ► Maharashtra, Karnataka.

Folk ► Rukhaalu, Maanakand (Maharashtra). Lakshmanaa is a doubtful synonym

Action ► Root—use for obstinate skin diseases and pruritus; also for disinfecting genitourinary tract and for promoting conception. *Alocasia indica* and *Eulophia nuda* are also known as Maanakanda in Indian medicine. *Alocasia indica* is used in Siddha medicine as an anti-inflammatory and diuretic herb.

Reseda luteola Linn.

Family ► *Resedaccae.*

Habitat ► Indigenous to western Europe; grown in gardens in India.

English ► Dyer's Rocket, Weld.

Action ► Plant—diuretic, diaphoretic, anthelmintic.

A luteolin glucoside, luteoloside, has been isolated from the fresh blossoms and outer parts of the plant. It has a low toxicity and mild influence on capillary resistance and possesses diuretic properties.

Reseda odorata Linn., known as Mignonette, is indigenous to North Africa and cultivated in gardens in India.

The herb is reported to allay irritation and ease pains. The seeds are applied externally as a resolvent. The root is acrid and is used in Spain as a laxative, diuretic and diaphoretic.

Rhamnus procumbens Edgew.

Family ► *Rhamnaceae.*

Habitat ► Western Himalayas from Simla to Kumaon at an altitude of 2,300 to 2,600 m.

English ► Buckthorn (related species).

Action ► Plant—anticonvulsant, anti-inflammatory, anti-ulcer.

The plant contains kaempferol, kaempferol-7-O-methyl ether and kaempferol-4′-O-methyl ether.

The ethyl acetate soluble portion of the alcoholic extract showed antinociceptive, anticonvulsant and anti-inflammatory activity. Kaempferol-4′-O-methyl ether was found to exhibit central nervous system depressant, cardiac stimulant, antispasmodic and anti-inflammatory activity.

The plant also contain emodin, which exhibited cardiac and intestinal stimulant, central nervous system depressant and analgesic activity in experimental animals.

Rhamnus purshiana DC.

Synonym ► *Frangula purshiana* (DC) A. Grey.

Family ► *Rhamnaceae.*

Habitat ► Native to Europe; introduced in Kashmir, Himachal Pradesh, Bhutan and the Nilgiris.

English ► Buckthorn (related species), Cascara Sagrada, Sacred Bark.

Action ► Bark—stool-softener, non-habit forming stimulant laxative, pancreatic stimulant. Used for dyspepsia and habitual constipation.

Key application ► In occasional constipation. (*German Commission E, ESCOP, WHO.*) As a stimulant laxative. (*The British Herbal Pharmacopoeia.*)

The bark contains up to 10% anthraquinone glycosides, consisting of the cascarosides A, B, C and D, about 70% of the total; other glycosides in minor concentrations include barbaloin, frangulin, chrysanol, glycosides based on emodin, aloe-emodin, emodin-oxanthrone and chrysophanol; dianthrones, and free aglycones.

The cascarosides act on large intestines and stimulate peristalsis. The emodin exhibits antispasmodic activity in isolated rat intestine. Its anti-inflammatory and antiseptic action was also demonstrated.

Rhamnus catharticus Linn., is equated with common Buckthorn, *R. purpurea* Edgew. with Purple Buckthorn. *R. purpurea* is found in the Himalayas from Kashmir to Nepal.

Dried bark of *Rhamnus frangula* L. (Alder Buckthorn) and dried ripe berries of *Ramnus catharticus* are also used against constipation. (*German Commission E, WHO.*)

Long term use or excessive amounts may cause albuminuria, haematuria, slowing of intestinal transit and cardiac irregularities. (Sharon M. Herr.)

Rhamnus triquetra Brandis (known as Gudlei, Fagoraa, Gardhan in Punjab; Gaunt in Garhwal and Kumaon and Katheraa in Jaunsar) is found in the Himalayas from Kashmir to Nepal. The bark is used as a tonic, astringent and deobstruent. Kaempferol, its 7-O-methyl ether and 4′-O-methyl ether, physcion-8 beta-D-glucoside, emodin and its 8 beta-D-glucoside were isolated from the whole plant. Emodin exhibited CNS depressant activity. (*Fitoterapia,* 65, 1994.) The plant exhibited significant anti-inflammatory and a nonspecific antispasmodic activity. It induced cardio-stimulation which might be due to the endogenous release of catecholamines.

Rhamnus napalensis Wall. ex M. Laws. (known as Archal in Nepal; Biringa and Birringguli in Assam) is found in eastern Himalayas and the hills and plains of Assam, Bihar, Orissa, Madhya Pradesh and northern Andhra Pradesh, ascending up to an altitude of 2,000 m. The fruit, pounded and macerated in vinegar, is prescribed for the treatment of herpes.

Rhamnus virgatus Roxb.

Family ► *Rhamnaceae.*

Habitat ► Throughout Himalayas, Khasi and Jaintia Hills, hills of Orissa, Madhya Pradesh, and the Nilgiris.

English ► Indian Buckthorn.

Folk ► Chhaduaa, Tadru (Punjab), Chadolaa (Garhwal).

Action ► Ripe fruit—purgative, emetic. Given in the affections of

spleen. (Purgative action not found in the bark.)

The bark showed only traces of hydroxymethyl anthraquinones and did not exhibit purgative action on experimental animals.

The plant contains the enzyme, rhamnodiastase, capable of hydrolyzing flavonoid glycosides.

Rhamnus wightii Wight & Arn.

Family ► *Rhamnaceae.*

Habitat ► Hills of Peninsular India, up to an altitude of 2,000 m.

Ayurvedic ► Rakta-Rohidaa (a name applied to several other astringent herbs).

Action ► Bark—bitter, astringent and deobstruent.

The leaves gave chrysophanol, physcion, musizin, lupeol, rhamnazin, rhamnocitrin, emodin, frangulin A and beta-sitosterol. A naphthalene-glucoside lactone—beta-sorigenin-1-O-beta-D-glucoside has been isolated from the stem bark. Cynodontin, chrysophanol, physcion, musizin, lupeol, emodin, beta-syriogenin, beta-sitosterol and its glucoside were also isolated.

Rhaphidophora laciniata (Burm. F.) Merr.

Family ► *Araceae.*

Habitat ► Deccan Peninsula, Coromandel Coast, Malabar and southwards to Sri Lanka.

Folk ► Ganesh-kand (Maharashtra); Aaanaiittippili (Tamil Nadu).

Action ► Antidote to poisonous inflictions; used against bites of poisonous raptiles.

Rheum emodi Wall. ex Meissn.

Synonym ► *R. australe* D. Don.

Family ► *Polygonaceae.*

Habitat ► Sub-alpine Himalayas, from Kashmir to Sikkim at altitudes of 3,300–5,200 m.; also cultivated in Assam.

English ► Indian Rhubarb, Himalayan Rhubarb.

Ayurvedic ► Amlaparni, Pitamuuli, Gandhini Revatikaa. Revandachini (roots).

Unani ► Revandchini.

Siddha/Tamil ► Revalchinikattai, Nattirevaichini.

Action ► Purgative, astringent, aperient. Used for constipation and atonic dyspepsia. Not advised for patients suffering from gout, rheumatism, epilepsy. (When given internally, the root imparts a deep tinge to the urine.)

The root gave emodin, emodin-3-monomethyl ether, chrysophanol, aloe-emodin, rhein. These occur free and as quinone, anthrone or dianthrone glycosides. The astringent principle consists of gallic acid together with small amounts of tannin. The drug also contain cinnamic and rheinolic acids, volatile oil, starch and

R

calcium oxalate. Two major glycosidic active principles, sennoside A and B, are present along with free anthraquinones.

At low doses, the tannin exerts astringent effect and relieves diarrhoea; at higher doses anthraquinones stimulate laxative effect and relieve constipation. (*Natural Medicines Comprehensive Database,* 2007.)

There are three main types of rhubarbs—Chinese, Indian or Himalayan, and Rhapontic.

The Chinese rhubarb consists of the rhizomes and roots of *Rheum palmatum* and *R. officinale.*

The Indian rhubarb consists of dried rhizomes of *R. emodi* and *R. webbianum;* rhizomes and roots of *R. moorcroftianum* and *R. spiciforme* are also reported to be mixed with the drug. *R. rhaponticum* is the Rhapontic rhubarb.

Rheum moorcroftianum Royle (the Himalayas at altitudes of 3,000–5,200 m., chiefly in Garhwal and Kumaon) possesses properties similar to those of *R. emodi* and the roots are mixed with the latter.

Rheum spiciforme Royle (drier ranges of Kumaon and Sikkim at altitudes of 2,700–4,800 m.) also possesses purgative properties. The rhizomes and roots are mixed up with Himalayan rhubarb.

Rheum webbianum Royle (the western and central Himalayas at altitudes of 3,000–5,000 m.) is the source of Himalayan rhubarb.

Rheum palmatum is esteemed as the best type of (Chinese) rhubarb. Two new stilbene glycosides, 4′-O-methylpiceid and rhapontin, isolated from the roots, exhibited moderate alpha-glucosidase inhibitory activity. Anthraquinone glucoside, pulmatin, isolated from the roots, along with its congeners, chrysophanein and physcionin, showed cytotoxic activity against several types of carcinoma cells. Polysaccharides, isolated from the roots and rhizomes, contained lyxose, glucose, galactose, xylose, rhamnose, mannose and ribose.

Dosage ► Root—0.2–1.0 g powder. (*CCRAS.*)

Rheum nobile Hook. f. & Th.

Family ► *Polygonaceae.*

Habitat ► The Himalayas from Nepal to Bhutan at 3,900–4,800 m.

Folk ► Tehuka (Sikkim).

Action ► The roots resemble those of *Rheum emodi,* but are spongy and inert. Stems are acidic, used as salad. Dried leaves are sometimes used as a substitute for tobacco.

Rheum officinale Baillon.

Family ► *Polygonaceae.*

Habitat ► Southeast Tibet, West and Northwest China.

English ► Rhubarb.

Unani ► Usaare Rewand.

Action ► Astringent and cathartic (anthraquinones are laxative and tannins astringent), stomachic, aperient, cholinergic, gastric stimulant, antispasmodic, anti-inflammatory,

antiseptic. Used for indigestion, diarrhoea, dysentery and disorders of liver and gallbladder.

Key application ► In constipation. Contraindicated in acute intestinal inflammation and obstruction. (*German Commission E, ESCOP, The British Herbal Pharmacopoeia, WHO.*)

Rhubarb contains 1,8-dihydroxyanthracene derivatives. The laxative effect of the herb is primarily due to its influence on the motility of the colon, inhibiting stationary and stimulating propulsive contractions. Stimulation of the chloride secretion increases the water and electrolyte content of stool. (*German Commission E.*)

The plant extract of *R. officinale* is found to be strong and effective scavenger of oxygen radicals in xanthine/xanthine oxidase and other systems *in vitro*.

Rheum rhaponticum, known as Rhapontic or English rhubarb, is extensively cultivated all over Europe and America; also cultivated to a small extent in India in the Khasi Hills, the Nilgiris and West Bengal.

Rhubarbs contain anthraquinones but English rhubarb contains only chrysophanic acid and some of its glycosides. Stilbene glycosides, present in other types, are also found in English rhubarb. The roots contain rhapontin. (1.42%), reported to restore oestrus cycle in castrated female rats.

Rheum webbianum Royle.

Family ► *Polygonaceae.*

Habitat ► Western Himalayas.

Folk ► Archa.

Action ► Antispasmodic, muscle relaxant, antiseptic.

The rhizomes contain desoxyrhapontigenin. The compound, like papaverine, exhibited smooth muscle relaxant activity in a wide variety of *in vitro* and *in vivo* tests. Aqueous alcoholic extract showed papaverine-like non-specific spasmolytic activity.

The paste of fresh rhizomes is applied on burns, blisters and boils to prevent scar formation.

Rhinacanthus nasutus (L.) Kurz.

Synonym ► *R. communis* Nees. *Justicia nasuta* L.

Family ► *Acanthaceae.*

Habitat ► Throughout the greater part of India.

English ► Snake Jasmine.

Ayurvedic ► Yuuthiparni, Yuuthikaparni. Paalaka-Juuhi.

Unani ► Gul-baglaa.

Siddha/Tamil ► Nagamalli.

Action ► Leaf, seed and root—used for skin diseases. A paste of the root, with lime juice, is applied externally to eczema, ringworm and Dhobi's itch.

The roots are reported to contain an antiseptic and antiparasitic active principle, rhinacanthin (1.9%). The plant is rich in potassium salts; also contains oxymethyl anthraquinones.

The flowers contain rutin.

Dosage ► Leaf, seed, root—5–10 ml juice; 3–5 g powder. (*CCRAS.*)

Rhizophora mucronata Lam.

Family ► *Rhizophoraceae.*

Habitat ► The Sunderbans and along the Coromandel Coast and the Andamans.

English ► True Mangrove.

Siddha/Tamil ► Peykkandal, Kandal, Sorapinnai.

Folk ► Kamo (Bengal), Kandal (Maharashtra).

Action ► Bark—astringent. Used in the treatment of haemorrhages, haematuria.

The leaves contain 9.1, unripe fruits 12.0, ripe fruits 4.2, twig bark 9–12, and wood 7–14% tannins.

The leaves gave campesterol, cholesterol, 28-isofucosterol, beta-sitosterol, stigmasterol and stigmast-7-en-3 beta-ol. The plant gave alpha-and beta-amyrins, betulin, lupeol, oleanolic and ursolic acids; gibberellins have also been reported.

Honey collected from the flowers is reported to be poisonous.

R. apiculata Blume, also known as Kandal, is found mixed up with *R. mucronata* in the tidal marshes of India and the Andamans.

Rhododendron anthopogon D. Don.

Family ► *Ericaceae.*

Habitat ► The alpine Himalayas from Himachal Pradesh to Bhutan, from 3,000 to 5,000 m.

Folk ► Taalisri (Punjab), Taalish (Tibet), Tazaktsum, Taalis-faz (Kashmir).

Action ► Leaves—stimulant. The plant yields an incense. The leaves of *R. anthopogon* get mixed up with those of *Abies webbiana* (used for respiratory diseases).

The leaves contain quercetin, myricetin, taxifolin, kaempferol derivatives, ursolic acid and its acetate, *epi*-friedinol, beta-sitosterol, betulinic acid and rutin.

The leaves of *R. lepidotum* Wall. ex G. Don, known as Taalisfur in Punjab; and *R. setosum* D. Don, known as Tsalluo in Bhutan, possess properties similar to those of *R. anthopogon.*

Rhododendron arboreum Sm.

Synonym ► *R. puniceum* Roxb.

Family ► *Ericaceae.*

Habitat ► The temperate Himalayas from Kashmir to Bhutan, the Nilgiris, Khasi Hills and Travancore.

English ► Tree-Rhododendron, Rose-Tree.

Folk ► Burans (Kumaon), Kurbak, Pullaas.

Action ► Leaf—anticephalalgic (applied to the forehead). Leaf and stem-bark—spasmolytic. Flowers—used in diarrhoea and dysentery.

The green leaves contain a glucoside, ericolin. The extracts of leaves,

stems and bark cause hypotension in cats and inhibit intestinal movements in rabbits. The acetone and chloroform extracts and a resinous fraction from the alcoholic extract of leaves depress respiration. The petroleum ether extract decreases the rate of heartbeat and contraction in isolated heart of frog.

An alcoholic (50%) extract of the flowers lowered blood pressure in dogs and albino rats.

Cyanidin-3-galactoside and cyanidin-3-arbinoside are present in the pigments of flowers. The leaves of var. *nilgiricum* and var. *cinnamonum* contain ursolic acid, friedelin, epifriedelanol, quercetin. A triterpenoid, campanulin, has been isolated from the leaves of var. *nilagaricum*.

Rhododendron barbatum
Wall. ex G. Don.

Family ▶ *Ericaceae.*

Habitat ▶ The Himalayas from Kumaon to Bhutan, extending to Assam.

English ▶ Giantblood Rhododendron.

Folk ▶ Chimal (Nepal), Kurbak, Guraans.

Action ▶ Respiratory depressant, emetic, toxic.

The leaves and flowers gave andromedotoxin which resembles tertiary amine veratrum alkaloids, particularly protoveratrine, in pharmacological action. Intravenous administration of andromedotoxin to dogs resulted in 20–40% reduction in blood pressure. It also closely resembles protoveratrine in its stimulating effect on the barostatic-pressor-reflex-mechanism, respiratory effects and emetic action. It produces reflex vasodepressor responses in intact animals; in debuffered dogs, it produced vasopressor responses. It also produced, both direct and indirect, positive ionotropic effects, the latter being more pronounced.

The leaves contain ursolic acid, alpha-amyrin, *epi*-friedelinol, campanulin and hyperoside. Chloroform extract of the leaves and shoots showed a depressant action. The honey from flowers is poisonous; contains andromedotoxin.

Rhododendron campanulatum
D. Don.

Synonym ▶ *R. aeruginosum* Hk. f.

Family ▶ *Ericaceae.*

Habitat ▶ Throughout the Himalayas at altitudes of 2,400–5,200 m.

Folk ▶ Chimal (Kumaon, Nepal), Gagger vurmi, Nichnai (Kashmir). Cherailu, Taalis-far.

Action ▶ Leaves—used in chronic rheumatism and sciatica. As a snuff, in colds and hemicrania.

The leaves gave a toxic substance which resembles andromedotoxin; besides ericolin, ursolic acid, alpha-amyrin, friedelin, *epi*-friedelinol, campanulin, quercitin. The pigments of flowers contain myricetin and quercetin.

Petroleum ether and chloroform extracts of leaves, stems and flowers lower blood pressure in cats and inhibit intestinal movements in rabbits.

Rhododendron cinnabarinum Hook. f.

Family ► *Ericaceae.*

Habitat ► Eastern Himalayas, extending into the Balipura tract and Aka hills of Assam at altitudes of 2,100–4,000 m.

Folk ► Balu, Sanu, Chimal (Nepal).

Action ► Plant—vasodepressor.

The plant contains a toxic principle, andromedotoxin. The leaves are reported to contain friedelin, *epi*-friedelinol, alpha-amyrin, campanulin, ursolic acid, triterpenes and quercetin.

The flowers are reported to be poisonous.

R. falconeri Hook. f., known as Korlinga in Nepal, Kegu and Kalma in Bhutan, is found in the Himalayas from Nepal to Bhutan, Aka Hills, Naga Hills and Manipur at altitudes of 2,100–4,300 m.

The leaves and stem contain andromedotoxin; leaves also contain ursolic acid, alpha-amyrin, friedelin, campanulin and quercetin. The flowers contain 3-rhamnoside and 3-galactoside of quercetin. The bark gave taraxerol, betulinic acid and quercetin.

Petroleum ether extract of the leaves and stems lowers blood pressure in cats and inhibits intestinal movements in rabbits.

R

Rhus chinensis Mill.

Synonym ► *R. javanica* Linn.
R. semialata Murr.
Brucea javanica (L.) Merill.

Family ► *Anacardiaceae.*

Habitat ► The temperate Himalayas from Kashmir to Bhutan at 1,300–2,400 m.

Folk ► Tatri, Arkhar (Punjab).

Action ► Galls—astringent and expectorant. Used in ointments and suppositories employed in the treatment of haemorrhoids, swellings and wounds. Fruits—spasmolytic. Used for colic, diarrhoea and dysentery.

Dry galls contain 50 to 80% tannin (in the form of Gallo tannic acid); small amounts of fat, resin and gum. The stem-bark contains 10.5% tannin. The fruit contains tannin, gallic acid and potassium acid salts, together with small amounts of aluminium, calcium, magnesium and iron acid salts of malic, tartaric and citric acids.

The heartwood contained the flavonoids, pongapin, tetramethoxyfisetin and demethoxykanugin, and a dibenzoylmethane, ovalitenone.

Rhus hookeri Sahni & Bahadur, synonym *R. insignis* Hk. f. is found in Sikkim Himalaya from Nepal to Bhutan at 1,600–2,000 m and in Khasi Hills at 1,500 m. Juice of the plant is a powerful vesicant. The fruit contain a fat similar to that found in the fruit of *R. javanica.*

Rhus coriaria Linn.

Family ► *Anacardiaceae.*

Habitat ► Mediterranean region.

English ► European or Sicilian Sumach (used in Unani medicine).

Unani ► Sumaaq, Taatraak.

Action ► Leaves and seeds—astringent, styptic.

Limonene, nonanal and dec-2 (Z)-enal were obtained from pericarp oil, whereas the leaf oil contained beta-caryophyllene and patchoulane. Cembrane and beta-caryophyllene were isolated from branch and bark oil.

Rhus parviflora Roxb.

Family ► *Anacardiaceae.*

Habitat ► Dry hot slopes of the Himalayas from Punjab to Nepal and in the hills of Madhya Pradesh and South India.

English ► Sumach.

Ayurvedic ► Tintidi, Tintindeeka.

Unani ► Sumaaq.

Folk ► Raitung, Tung (Kumaon).

Action ► Fruit juice—vermifuge.

The leaves contain the flavonoids, myricetin, quercetin and kaempferol and their 3-O-rhamnosides; the stems and leaves also gave hentriacontane, hentriacontanol, beta-sitosterol, lignoceric acid and iso-rhamnetin-3-alpha-L-arvinoside.

Smooth Sumach and Sweet Sumach (Canada and USA) are equated with *Rhus glabra* L. and *R. aromatica* Ait. Smooth Sumach is astringent and diuretic. Sweet Sumach is used for its antidiabetic activity; the root bark is used for irritable bladder, bed-wetting and urinary incontinence. (*Natural Medicines Comprehensive Database*, 2007.)

Dosage ► Fruit—3–6 g powder. (*CCRAS.*)

Rhus succedanea Linn.

Synonym ► *R. acuminata* DC.

Family ► *Anacardiaceae.*

Habitat ► The temperate Himalayas, from Kashmir, Sikkim to Bhutan at altitudes of 600–2,500 m.

English ► Japanese Wax tree, Wild Varnish tree.

Ayurvedic ► Karkatashringee. (Used as a substitute for *Pistacia integerrima* galls.).

Unani ► Kaakraasingi.

Siddha/Tamil ► Karkatakasringi, Kadukapoo (galls).

Action ► Thorn-like excrescences on the branches—astringent, expectorant; prescribed in diarrhoea, dysentery and vomiting. Fruits—expectorant (used as an adjuvant in tuberculosis).

The sapwood and heartwood contain polyphenols. The sapwood contains gallo tannin; the heartwood gave fisetin, and its -7-glucoside, fustin, garbanzol, 3,7,4′-trihydroxyflavone, gallic and ellagic acid. The bark is reported to contain 10% of tannin.

The juice from the leaves causes blisters. Leaves contain 20% tannin (dry basis), a flavone glycoside rhoifolin, corilagin and shikimic acid. Ethanolic

R

extract of the leaves is reported to exhibit anticancer and antiviral activities. Latex from the stem also causes blisters.

Mesocarp of the fruit contains ellagic acid. An acid isolated from the fruit is reported to be cardiotonic and sympathomimetic. It was found to be toxic to rabbits. However, the fruits are used in the treatment of tuberculosis. Hinokiflavone, isolated from the fruits, showed cytotoxic activity *in vitro* against KB culture cells.

Drupes are rich in biflavones.

The wax obtained from the pulpy mesocarp of the fruit contains palmitic 77, stearic 5, dibasic 6, oleic 12%, and linoleic acid (a trace). It is used as a substitute for beeswax.

Rhynchosia minima (L.) DC.

Family ► *Papilionaceae.*

Habitat ► All over plains and in the Himalayas up to 1,200 m.

Folk ► Raan-ghevaraa (smaller var.) (Maharashtra); Jhinki, Kammervel (Gujarat); Chittavarai (Tamil Nadu).

Action ► Leaves—abortifacient. Seeds—bitter, toxic.

The leaves afforded isovitexin and apigenin derivatives.

Aerial parts gave steroidal glycosides, along with ergosterol peroxide, stigmasterol and lupeol; bergapten, isopimpinellin, umbelliferone and beta-sitosterol have also been isolated.

The seed coat and pericarp contained gallic and protocatechuic acid, prodelphinmidine and hydroquinone diacetate and C-glycosyl flavones.

The extract of seeds shows agglutinating activity with certain type of human red blood cells.

R. bracteata Benth. ex Baker (upper Gangetic plains) and *R. jacobii* Chandra & Shetty (Tirunelveli, Tamil Nadu) contain vitexin, isovitexin, orientin, *iso*-orientin and apigenin derivatives.

Ribes nigrum Linn.

Family ► *Grossulariaceae.*

Habitat ► Cold temperate regions extending from Himalayas to northern Asia and Europe.

English ► European Black Currant.

Folk ► Nabar.

Action ► Dried leaves and twigs—a home remedy for coughs. Leaves—diuretic, hypotensive, refrigerant. An infusion is used for inflammatory conditions, sore throat, hoarseness. Fruits—refrigerant, mildly spasmolytic, vasoprotective, anti-inflammatory.

Black currents are very rich in vitamin C (average 150 mg/100g) and contain 0.9–1.7% pectin as calcium pectate, also minerals, potassium (372 mg/100 g). The acidity of the fruit is mainly due to citric acid; malic acid is present in small amounts. Glucose and fructose are principal sugars; sucrose is a minor component.

The flavonoids in the fruits include kaempferol, quercetin and myricetin. About 0.3% anthocyanosides, concentrated mainly in the skin, consist of glycosides of cyanidol and delphinidol.

The anthocyanosides are reportedly bacteriostatic and exhibit vasoprotective and anti-inflammatory activity. They are antisecretory against cholera toxin-induced intestinal fluid secretion *in vitro*.

The leaves contain an anti-inflammatory principle, pycnometol and minute quantities of an essential oil composed mostly of terpenes.

Polyphenolic extract of buds inhibited lipid peroxidation by rat liver microsomes.

Polyphenols present in *R. nigrum* and *R. rubrum* (Red Current, Western Himalayas from Kumaon to Kashmir) exhibit free radical scavenging activity. The seed oil lowers VLDL and total cholesterol.

Contraindicated in bleeding disorders. (Sharon M. Herr.)

Ricinus communis Linn.

Family ▶ *Euphorbiaceae.*

Habitat ▶ Cultivated chiefly in Andhra Pradesh, Maharashtra, Karnataka, and Orissa.

English ▶ Castor seed.

Ayurvedic ▶ Eranda, Chitrabija, Triputi; Tribija, Vaataari, Chanchu, Manda, Uruvaka, Gandharva-hastaa, Panchaangula, Vardhamaana, Uttaanpatraka, Vyaaghrapuchha, Chitraa.

Unani ▶ Bedanjeer, Arand.

Siddha/Tamil ▶ Ammanakku.

Action ▶ Oil from seeds and young leaf—purgative. Oil is used in dermatosis and eczema. Leaves—used as poultice to extract the worm. Root—a decoction is administered for lumbago and allied complaints. Bark—purgative.

The Ayurvedic Pharmacopoeia of India recommends the decoction of the dried, mature root in rheumatism, pain in the urinary bladder, lumbago, diseases of the abdomen and inflammations; fresh leaf in helminthiasis, dysuria, arthritis, pain in the urinary bladder, dysuria, abscesses; dried seed powder in constipation, rheumatism, diseases of the liver and spleen, piles, lumbago, sciatica.

The root extract exhibited significant anti-inflammatory activity against carrageenan-, bradykinin-, 5-HT-and dextran-induced rat hind paw oedema. N-Demethylricinine showed dose-dependent anticholestatic and hepatoprotective activities in rats.

Castor oil, derived from the seeds, is a well-known purgative (dose 5–20 ml).

Castor seed contains toxic components (2.8–3.0% on whole seed; about 10% in the flour) which are highly poisonous to human beings and animals. The principal toxic substance is the albumin, ricin. Allergens and a feebly toxic alkaloid ricinine is also present. An ulcerative factor in the seed is reported. Like other toxalbumins, ricin agglutinizes the mammalian red bleed corpuscles. (Ricin loses its toxicity and antigenic action on treatment with potassium permanganate.)

Castor oil consists principally of ricinoleic acid. Stearic, oleic, linoleic and dihydroxystearic acids are present in small amounts. The strong laxative

property of castor oil is reported due to the local irritant action caused in the intestines by ricinoleic acid formed by hydrolysis under the influence of lipolytic enzymes. (The oil should not be used with fat-soluble vermifuge, it may increase its absorption and toxicity.)

Dosage ▶ Root—20–30 g for decoction. (*API,* Vol. I.) Leaf—10–20 ml juice; 2–5 g powder; seed—0.5–3 g powder. (*API,* Vol. III.)

Rivea corymbosa Hallier f.

Family ▶ *Convolvulaceae.*

Habitat ▶ Native to tropical America; cultivated as an ornament in gardens in Mumbai, Pune and Belgaum.

English ▶ Ololiuqui, Snake Plant.

Action ▶ Seeds—narcotic.

The psychic effect produced by the ground seeds have been ascribed to the presence of ergot-type alkaloids (up to 0.07%) found in embryo. Among the principal alkaloids identified in the seeds are: ergine, isoergine, elymoclavine, lysergol and chanoclavine. Ergometrine, clymoclavine, penniclavine and ergometrinine have also been reported. Ergine has been reported to be the most and lysergol the least effective.

A glucoside, turbicoryn, isolated from the seeds, was found to have a CNS stimulant action. (Doses exceeding 31.6 mg/kg proved fatal to test animals in 5–10 min.)

Ergine and isoergine are present in the leaves (0.03%, dry basis) and stems (0.01%, dry basis) but not in the roots.

Rivea hypocrateriformis Choisy.

Family ▶ *Convolvulaceae.*

Habitat ▶ Throughout India.

English ▶ Midnapore Creeper.

Ayurvedic ▶ Phanji.

Siddha/Tamil ▶ Budthi-kiray.

Folk ▶ Kalmi-lataa, Phaang.

Action ▶ Root—a tonic after childbirth. Leaves—astringent; used in haemorrhagic diseases, diarrhoea, dysentery.

Rivea ornate (Roxb.) Choisy.

Family ▶ *Convolvulaceae.*

Habitat ▶ South India.

Ayurvedic ▶ Phanji (var.).

Siddha/Tamil ▶ Machuttai.

Folk ▶ Baravat, Phaang.

Action ▶ Juice of the plant—used topically in haemorrhagic diseases and piles.

Rivina humilis Linn.

Synonym ▶ *R. laevis* Linn.

Family ▶ *Phytolacaceae.*

Habitat ▶ Native to warmer parts of America; introduced into Indian gardens.

English ▶ Baby Pepper, Dog Blood, Blood Berry, Rouge-Plant.

Action ▶ Berries—febrifuge, intestinal antiseptic.

A betaxanthin, humilixanthin, has been isolated from the berry.

A decoction of the herb is used for cold, chest congestion and pain, diarrhoea and jaundice. Berries alleviate dysentery and amenorrhoea.

Pounded leaves are used for wound-healing and for treating catarrh.

Robinia pseudoacacia Linn.

Family ► *Fabaceae.*

Habitat ► Western Himalayas and Jammu & Kashmir.

English ► Locust tree, False Acacia, Robinia, Black Locust.

Action ► Leaves—laxative, antispasmodic (an infusion is prescribed in digestive disorders). Flowers—diuretic, antispasmodic.

The bark, leaves and roots contain a toxalbumin, robin (1.6% in the bark), which resembles ricin present in the castor seed. The bark also contains a glucoside robinitin (3%), syringin, tannin (up to about 7.0%). Inner bark contains amygdalin and urease.

The leaves are rich in calcium, phosphorus and potash. The presence of glycosides, acaciin, apigenin-7-bioside, apigenin-7-trioside and indican, have also been reported.

The flowers are powerfully diuretic due to a glycoside, robinin. Flowers also contain *l*-asparagine.

The roots are rich in asparagine, also contain robin. Root bark, if taken in excess, is emetic and purgative.

The bark and young shoots are poisonous to livestock.

Rorippa dufia Hara.

Synonym ► *R. indica* Hiern. *Nasturtium indicum* DC.

Family ► *Brassicaceae.*

Habitat ► Throughout India, in damp places, ascending up to 2,100 m in the Himalayas.

Unani ► Khoobkalaan (also equated with *Sisymbrium iro* Linn., Hedge Mustard, London Rocket).

Siddha/Tamil ► Kattu-kadugu.

Action ► Plant—antiscorbutic, stimulant, diuretic (given in diarrhoea, dysentery and fever). Seeds—laxative, prescribed in the treatment of asthma.

Glucosinolates of 8-methylthio-octyl, 8-methylsulphinyloctyl and 2-phenylethyl have been isolated from the seeds.

R. islandica (Oeder) Borbas (Bihar, Bengal, Kerala) and *R. montana* Small (Punjab to Sikkim) are used for antiscorbutic, digestive and diuretic properties.

Rosa alba Linn.

Family ► *Rosaceae.*

Habitat ► Asian Minor region. Cultivated in Indian gardens.

English ► Common English Dog Rose, White Cottage Rose.

Ayurvedic ► Sevati, Shveta Taruni. (Flowers—white or bluish.)

Unani ► Sevati. Garden var.—Gul-safed Bustaani, Vard Abyaz.

Wild var.—Gul-safed Sahraai, Vard Abyaz Barri.

Action ► Flower—cardiac tonic, prescribed in palpitation of heart, febrifuge. Petal—laxative.

Rose hip contains pectin, citric acid and malic acid which are responsible for its laxative activity.

The pollen contains carotene (2.08 mg/100 g), free and bound amino acids and sugars.

The major constituents of the essential oil are geraniol, beta-phenylethyl alcohol, beta-geranic acid, geraniol esters, nerol, citronellol, eugenol, methyleugenol and benzoate.

R. Canina Linn. is equated with (Indian) Dog Rose. The anthocyanin, isolated from the petals, exhibits radioprotective effect. The scavenging and antilipoperoxidant activities of the fruit depend on the polyphenol content.

Rosa bourboniana Desportes.

Family ► *Rosaceae.*

Habitat ► Cultivated throughout India, particularly in Uttar Pradesh on commercial scale, for rose water.

Ayurvedic ► Taruni, Desi Gulaab, Baaraamaasi, Cheenia-Gulaab. (Flowers—usually purple.)

Siddha ► Rojapoo (Tamil).

Action ► Fruit—applied to wounds, injuries, sprains, foul ulcers.

Rosa centifolia Linn.

Family ► *Rosaceae.*

Habitat ► Cultivated chiefly in Uttar Pradesh and Bihar.

English ► Cabbage Rose, Provence Rose, Hundred-leaved Rose.

Ayurvedic ► Shatapatri, Shatapatrikaa (Shatapatra is equated with *Nelumbo nucifera.*), Taruni, Devataruni, Karnikaa, Chaarukesharaa, Laakshaa, Gandhaaddhyaa. (Flowers—usually pink and double.)

Unani ► Gul-e-Surkh.

Siddha/Tamil ► Iroja, Rajapoo.

Action ► Flowers—a decoction is prescribed for inflammation of the mouth and pharynx, and ulcers of the intestine. Powder of rose buttons and seeds—astringent in haemorrhage and diarrhoea.

The flowers and leaves contain 1.3 and 8.5% of saponin respectively. Petels are reported to contain methionine sulphoxide.

Cabbage rose yields a volatile oil (0.2%) consisting mainly of citronellol, geraniol, nerol, phenylethanol, linalool and citral. It contains 15% tannins (oligomeric proanthocyanidins).

Dosage ► Dried flower—3–6 g powder. (*API,* Vol. III.)

Rosa chinensis Jacq.

Family ► *Rosaceae.*

Habitat ► Cultivated chiefly in Kannauj, Kanpur and Hathras.

English ► Bengal Rose, Monthly Rose.

Ayurvedic ▶ Taruni-Kantaka (non-classical). (Flowers—crimson or pink.)

Unani ▶ Chini Gulaab.

Folk ▶ Kaantaa-Gulaab.

Action ▶ Hips—applied to wounds, injuries, sprains and foul ulcers.

R. chinensis Jacq. and *R. borboniana* Desp. are synonyms of *Rosa indica,* found and cultivated throughout India. This variety is also known as Edward Rose or Kat Gulaab.

Rosa damascena Mill.

Family ▶ *Rosaceae.*

Habitat ▶ Cultivated chiefly in Aligarh, Ghazipur and Kannauj, grown in gardens throughout India.

English ▶ Damask Rose.

Ayurvedic ▶ Taruni. (Flowers—red, pink or white.)

Unani ▶ Gul-e-Surkh, Vard, Vard-e-Ahmar. Stamens—Zard-e-Vard. Fruit—Dalik, Samar-ul-Vard, Smar-e-Gul.

Siddha/Tamil ▶ Irosa.

Folk ▶ Fasali Gulaab.

Action ▶ Flower buds—astringent, expectorant, laxative; used as a cardiac tonic and aperient. Stamens and fruits—astringent. Petals—Gulkand (a confection in sugar)—laxative, anti-inflammatory (used in sore throat and tonsilitis. Rose water—cooling, refrigerant, antiseptic, anti-inflammatory (used as a remedy for skin irritation, also for sore eyes).

All parts of the rose plant yielded quercetin, kaempferol and cyanidin. Lycopene, rubixanthin, zeaxanthin, xanthophyll and taraxanthin have been isolated from the hips. The flowers contain an essential oil with citronellol, nerol, geraniol, beta-phenylethanol and its glucoside, eugenol and methyl eugenol; other constituents include organic acids, chlorogenic acid, tannin, cyanin, cyanidin and its 3,5-diglucoside, quercitrin, carotene and sugars. Pollen from flowers contain carotene (0.76 mg/100 g), sugars (1.0%) and chlorogenic acid (1.5%). Their proline content is found unusually high.

The red colouring matter consists of cyanin (9–10% on dry weight basis); a yellow glucoside of quercetin and quercitrin is also present. Flowers, usually, yield 0.04% oil or otto of rose.

Dog Rose, extensively cultivated in Europe, North Africa and parts of Asia, is equated with *Rosa canina* Lin. The rose hip contains vitamin C (0.2–2.0%), malic and citric acid, pectins (15%), invert sugar (12–15%), tannins (2%), carotenoids, flavonoids.

Preparations of Rose hips are used for the prevention and treatment of colds and influenza-type infections, for the treatment vitamin C deficiencies; and for increasing resistance.

Rosa macrophylla Lindl.

Family ▶ *Rosaceae.*

Habitat ▶ The temperate Himalayas from Punjab to Sikkim at altitudes of 1,200–3,600 m.

Ayurvedic ▶ Vanya Taruni (non-classical). (Flowers—pink, fruits—red.)

Folk ▶ Ban-gulaab.

Action ▶ Fruits—rich in vitamin C (769 mg/100 g).

Rosa moschata Hook. f. non-Mill. nec Herrm.

Synonym ▶ *R. brunonii* Lindl.

Family ▶ *Rosaceae.*

Habitat ▶ Central and Western Himalayas, ascending to 3,000 m.

English ▶ Himalayan Musk Rose. (Flowers—white, fruit—orange red or dark brown.)

Ayurvedic ▶ Kubjaka (non-classical).

Folk ▶ Kujai, Kuujaa.

Action ▶ Plant—used in bilious affections, irritation of the skin and eye diseases. Rose water and otto is extracted from the flowers in Himachal Pradesh.

Rosa multiflora Thunb.

Synonym ▶ *R. polyantha* Sieb. & Zucc.

Family ▶ *Rosaceae.*

Habitat ▶ Cultivated in Kulu. Occasionally found in hedges and abandoned coffee plantations in Upper Ghats.

Ayurvedic ▶ Rakta-Taruni (non-classical).

Folk ▶ Gulaab.

Action ▶ Fruit—antiseptic, applied to wounds, injuries, sprains and foul ulcers.

The fruit yielded beta-sitosterol, scoparone, salicylic and gallic acid. Fruits contained multiflorin; flower petals gave astragalin. A purgative compound, multinoside A acetate, has been isolated from the fruit. Quercetin-3-O-xyloside, isoquercitrin and hyperin were also isolated.

Floral absolute oil contains eugenol (22.8), phenylethanol (18.1) and heneicosane (10.2%).

The root gave a triterpenoid, tormentic acid.

The plant extract, along with kojic acid or its derivatives, produced excellent skin-lightening and sun-burn preventing effects.

Rosa rubra Blackw.

Synonym ▶ *R. gallica* Linn.

Family ▶ *Rosaceae.*

Habitat ▶ Indian gardens.

English ▶ French Rose.

Ayurvedic ▶ Rakta-Taruni (non-classical), Gulaab.

Action ▶ Dried petals—tonic and astringent. Used in debility, excessive mucous discharges and bowel complaints. The oil and rose water—used in bronchial asthma and as a remedy for skin irritation.

The flowers yield 0.027–0.036% of an essential oil. It contains geraniol 40–76, *l*-citronellol 15–37, nerol 5–10,

phenyl ethyl alcohol 3–9, eugenol 1, esters 3–5, phenyl acetic acid traces; and stearoptene 15–30%; citronellol, citral, farnesol, *l*-linalool and nonylaldehyde are also present. (The flowers, unlike those of *Rosa damascena,* develop their perfume when dried.)

The petals also contain fatty oil, sugars (3–14% as invert), tannin (Rosa tannic acid 10–24%), cyanin (up to 10%), cyanidin and quercitrin.

The pollen contains carotene (1.67 mg/100 g), free and bound amino acids and sugars.

Fresh hips and their pulp contain 545 and 847 mg/100 g vitamin C respectively.

Rosa sericea Lindl.

Family ► *Rosaceae.*

Habitat ► The temperate Himalayas from Chamba eastwards to Bhutan and Assam at altitudes of 2,500 to 4,200 m.

Folk ► Jangali Gulaab. (Flowers—white or yellow, fruit—red.)

Action ► Fruits—rich in vitamin C.

Rosa webbiana Wall.

Family ► *Rosaceae.*

Habitat ► Dry and inner Himalayas from Kashmir to Kumaon at altitudes of 900–4,000 m.

Ayurvedic ► Laddaakhi-Sevati. (Flowers— pink or deep red, fruit—red.)

Action ► Fruits—rich in vitamin C (751 mg/100 g,) concentration up to 8% in dry pulp.

Roscoea procera Wall.

Family ► *Zingiberaceae.*

Habitat ► The Himalayas at altitudes of 1,500–2,100 m, in grassy slopes.

Ayurvedic ► Kaakoli, Kshira-Kaakoli.

Action ► Tuberous root—revitalizing tonic, age-sustainer; used in restorative tonics.

One of the ingredients of the "Eight Tonic Herbs" (*Ashta-varga*) of Ayurvedic medicine.

Rosmarinus officinalis Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to the Mediterranean region, cultivated in Nilgiri Hills.

English ► Rosemary.

Folk ► Rusmari.

Action ► Essential oil from flowers and leaves—anti-inflammatory, astringent, antiseptic, stomachic, carminative; used externally in circulatory disorders. Flowering tops and leaves—carminative, diuretic, emmenagogue; vapor baths afford relief in incipient catarrh, rheumatism and muscular affections.

Key application ► Leaf—internally in dyspeptic complaints; externally in

R

supportive therapy for rheumatic diseases and circulatory problems. (*German Commission E.*) Shows improvement of hepatic and biliary function.(*ESCOP.*) Carminative, spasmolytic of hepatic and biliary function. (*ESCOP.*) Carminative, spasmolytic. (*The British Herbal Pharmacopoeia.*)

In research using rats, the essential oil and ethanolic extract of rosemary decreased drug-induced hepatotoxicity and the suppression of bone marrow cells. Phenolic compounds in the herb exhibit antioxidant activity. (Sharon M. Herr.)

The herb contains volatile oil (1.0–2.5%), composed mainly of 1, 8-cineole (20–25%), alpha-pinene (15–25%), camphor (10–25%), others include borneol, isobutyl acetate, camphene, limonene, linalool, 3-octanone, terpineol, verbenol; flavonoids including apigenin, diosmetin, diosmin; rosmarinic acid and other phenolic acids; diterpenes; rosmaricine; ursolic acid, oleanolic acid and their derivatives.

The anti-inflammatory effect of Rosemary has been attributed to rosmarinic acid, ursolic acid and apigenin. Among flavonoids, diosmin is reported to be more effective in decreasing capillary fragility than rutin. A rosmaricine derivative exhibits stimulant and mild analgesic activity.

The phenolic fraction, isolated from the leaves, also from the oil, exhibits antioxidant activity.

Pressed juice of leaves possesses a strong antibacterial action on *Staphylococcus aureus, E. coli* and *Bacillis subtilis.*

An infusion of the plant with borax is used as a hair wash for preventing hair loss.

Rosemary oil, in combination with the essential oil from thyme, lavender and cedarwood, showed improvement in hair growth by 44% after 7 months of treatment for alopecia areata. (*Natural Medicines Comprehensive Database,* 2007.)

Rotula aquatica Lour.

Synonym ► *Rhabdia lyciodes* C. B. Clarke in part non Linn.
Shretia cuneata Wt.

Family ► *Borginaceae.*

Habitat ► Kumaon to Assam and in Central, Western and Southern India, and the Andamans.

Siddha/Tamil ► Cheppu-nerinjal.

Folk ► Paashaanbheda (Karnataka).

Action ► Root—diuretic; used for stone in the bladder; also in venereal diseases. The diuretic action of the root is attributed to the presence of allantoin; a sterol, rhabdiol, has also been isolated from the roots.

Rourea minor (Gaertn.) Alston.

Synonym ► *R. santaloides* Wight & Arn.
Connarus santaloides Vahl.

Family ► *Connaraceae.*

Habitat ► Western parts of the Peninsula, from Konkan southward and in West Bengal and Assam.

Ayurvedic ► Vridha.

Folk ► Kal-vidhaaraa, Vaakeri (Maharashtra), Vardaar.

Action ► Roots and twigs—bitter tonic; prescribed in rheumatism, pulmonary complaints, scurvy, diabetes; externally for ulcers and skin diseases. Wood—a decoction is administered after parturition and as a febrifuge. Wood, roots and fruits—poisonous.

The plant is credited with antiseptic and antitubercular properties.

The roots contain beta-D-glucoside of beta-sitosterol, hentriacontane and meso-inositol.

Roylea cinerea (D. Don) Baillon.

Synonym ► *R. elegans* Wall. ex Benth. *R. calycina* (Roxb.) Briq.

Family ► *Lamiaceae.*

Habitat ► Himalaya from Kashmir to Nepal, at 1,200–3,700 m.

Folk ► Patkarru; Titpaati, Karanoi, Karui (Kumaon); Kaur, Kauri (Punjab).

Action ► Leaves—a decoction is used as a bitter tonic and febrifuge; also as a tonic in contusions. The leaves contain betulin, beta-sitosterol, beta-amyrin, stigmasterol, cetyl alcohol, glucose, fructose, arabinose and palmitic, stearic, oleic, gallic, oxalic and tartaric acids. The leaves and stems contain the diterpenes, calyenone, precalyone and calyone, and a triterpene, moronic acid. Precalyone exhibited antitumour activity against P-388 lymphocytic leukaemia.

Aerial parts exhibited spasmolytic and CNS-depressant activity.

Rubia cordifolia Linn.

Synonym ► *R. munjesta* Roxb.

Family ► *Rubiaceae.*

Habitat ► Throughout India, ascending to an altitude of 3,700 m.

English ► Indian Madder, Bengal Madder.

Ayurvedic ► Manjishthaa, Vikasaa, Samangaa, Yojanavalli, Kaalameshika, Raktaangi, Raktayashtikaa, Arunaa, Gandira, Jingi.

Unani ► Manjeeth.

Siddha/Tamil ► Manjitti.

Action ► Roots and dried stem—blood purifier, astringent, diuretic, emmenagogue, deobstruent, antidysenteric, antiseptic, alterative.

The Ayurvedic Pharmacopoeia of India recommends the use of the dried stem in blood, skin and urinogenital disorders; dysentery; piles, ulcers, inflammations; erysipelas, skin diseases and rheumatism. (Roots, leaves and seeds of *R. cordifolia, R. tinctorum* and allied species are used in amenorrhoea, liver diseases, gall and spleen complaints.) (Mutagenic and carcinogenic aspects of the drug are under investigation.)

It is reported that after oral administration of the root decoction, the urine and bones of the patient show a red tinge.

The roots are rich in anthraquinones and their glycosides (around 20), the

important ones include purpurin (trihydroxy anthraquinone), munjistin (xanthopurpurin-2-carboxylic acid); besides xanthopurpurin, peudopurpurin (purpurin-3-carboxylic acid), free alizarin as well as its glucoside.

Whole plant yielded pentacylic triterpenic acids—rubicoumaric and rubifolic acids.

Antitumour cyclic hexapeptides have been isolated from the root (while lucidin is thought to be carcinogenic).

The root extracts of *R. sikkimensis* Kurz, known as Naaga-Madder (Nepal eastwards to Assam, Nagaland and Manipur); are very similar to those of *R. cordifolia.*

Dosage ► Stem—2–4 g. (*API,* Vol. III.)

Rubia tinctorum Linn.

Family ► *Rubiaceae.*

Habitat ► Native to Southern Europe and parts of Asia; also found in Kashmir.

English ► Alizari, European Madder.

Action ► Root—used for menstrual and urinary disorders and liver diseases.

The root contains anthraquinone and their glycosides, including alizarin, purpurin, purpuroxanthin, pseudopurpurin, rubiadin, ruberythric acid and lucidin primeveroside. There are indications that lucidin is carcinogenic. All parts of the plant contained an iridoid, asperuloside.

Rubus ellipticus Sm.

Family ► *Rosaceae.*

Habitat ► Punjab to Assam, extending southwards into the Western Ghats and Deccan.

English ► Gach Strawberry.

Folk ► Hinsaalu, Anchhu. Gouri-phal (Kashmir), Tolu, Aselu (Nepal).

Action ► Root and young stem—administered in colic pain.

Extract of the leaves showed anticonvulsant activity against electrical-induced convulsions, potentiated hypnotic effect of pentobarbitone sodium and had positive inotropic and chronotropic effects. (*Compendium of Indian Medicinal Plants,* Vol. 5.)

Rubus fruticosus Linn. (European Black Berry, European Bramble, known as Vilaayati Anchhu) is cultivated in the valley of Kashmir and in Assam and Tamil Nadu up to 2,000 m. A decoction of the root is used for dysentery and whooping cough. The plant gave a triterpenic acid, rubitic acid, characterized as 7 alpha-hydroxyursolic acid.

Key application ► *Rubus fruticosus* leaf—in nonspecific, acute diarrhoea, mild inflammation of the mucosa of oral cavity and throat. (*German Commission E.*)

Rubus rugosus Sm. synonym *R. moluccanus* auct non Linn., (known as Kalsol in Kumaon) is found in Central and Eastern tropical and temperate Himalaya from Nepal to Sikkim and in Assam. The plant contains triterpenes, also afforded rubusic acid and

beta-sitosterol; leaves gave tormentic acid. Leaves exhibit astringent, emmenagogue and abortifacient properties.

Rubus niveus Thunb. (Mysore Raspberry, Mahabaleshwar Raspberry) is common in evergreen forests of Mahabaleshwar.

European Raspberry is equated with *Rubus idaeus* Linn. The leaves contain flavonoids, mainly glycosides of kaempferol, quercetin and tannins. Raspberry leaf tea has been used in Europe to facilitate child birth. Its uterine relaxant effects have been demonstrated in animals (the extract appears to effect only the pregnant uterus, no activity has been observed on the non-pregnant uterus).

The leaves of European Raspberry (*Rubus idaeus*) and other species exhibit astringent, carminative and spasmolytic activity. Leaves are used for painful and profuse menstruation and, as mentioned earlier, for making parturition easier. An infusion is used for bowel complains, also as a blood purifier. Leaves contain ascorbic acid (about 80 mg/100 g). Polyphenol content of the fruit (methanolic extract) exhibited scavenging and antilipo-peroxidant activities.

Rubus idaeus has been introduced into India and is cultivated on a small scale in South Indian hill stations.

The leaf of *Rubus idaeus* has been included among unapproved herbs by *German Commission E,* as its efficacy has not been documented.

Ruellia strepens Linn.

Family ► *Acanthaceae.*

Habitat ► Native to Central America; introduced into Indian garden as ornament.

Folk ► Kiranti-takkaaram (Tamil Nadu).

Action ► Herb—diuretic; used for urinary disorders in Siddha medicine.

Ruellia suffruticosa Roxb.

Synonym ► *Dipteracanthus suffruticosus* Viogt.

Family ► *Acanthaceae.*

Habitat ► Native to central America; introduced into Indian gardens as ornament.

Folk ► Chaarapaatu, Chaaraparaad (Bihar).

Action ► Plant—used in renal affections, gonorrhoea, syphilis and other venereal diseases.

R

Ruellia tuberosa Linn.

Family ► *Acanthaceae.*

Habitat ► Native to central America; grown in Indian gardens.

English ► Meadow-weed.

Siddha/Tamil ► Tapas-kaaya.

Action ► Herb—emetic; used as a substitute for ipecacuanha. A decoction is given in chronic bronchitis; also used as a diuretic for the treatment of stones in the bladder.

Rumex acetosa Linn.

Family ▶ *Polygonaceae.*

Habitat ▶ Western Himalayas from Kashmir to Kumaon.

English ▶ Garden Sorrel, Sorrel Dock.

Ayurvedic ▶ Chukram, Chuukaa.

Unani ▶ Hammaaz-Barri.

Action ▶ Laxative, diuretic, antiscorbutic, refrigerant. Used for scurvy, as a cooling drink in febrile disorders, as a corrective of scrofulous deposits. Seeds—astringent (in haemorrhages).

Flowers—hepatoprotective and antihaemorrhagic. Root—used for jaundice, also for gravel and stone in the kidneys.

Aerial parts gave rutin, hyperin and vitexin and traces of oxymethylanthraquinone. The roots contain anthraquinones—chrysophanol, physcion and emodin anthrones.

The leaves contain 124.0 mg/100 g ascorbic acid, about 0.3% oxalic acid. Free oxalic acid caused fatal hypoglycaemia in rabbits.

Rumex acetosella Linn.

Family ▶ *Polygonaceae.*

Habitat ▶ Eastern Himalayas, Sikkim and the Nilgiris.

English ▶ Sheep Sorrel.

Ayurvedic ▶ Chukrikaa, Chuko.

Unani ▶ Hammaaz, Shaaka-turshak, Tursh, Jangali Paalak.

Action ▶ Diuretic, diaphoretic, antiscorbutic, refrigerant. Fresh plant is used in urinary and kidney diseases.

The herb contains anthraquinones, chrysophanol, emodin and physcion.

Free ascorbic acid content (50–150 mg/100 g) remains constant throughout the year.

Rumex crispus Linn.

Family ▶ *Polygonaceae.*

Habitat ▶ Native to Europe; found in Mt. Abu.

English ▶ Yellow Dock, Curled Dock.

Ayurvedic ▶ Chukra, Chukrikaa, Patraamla, Rochani, Shatvedhani.

Action ▶ Root—used as a laxative in rheumatism, bilious disorders, and as an astringent in piles and haemorrhagic affections; also used for skin eruptions, chronic skin diseases, scrofula, scurvy, congested liver and jaundice. Acts like Sarsaparilla when used for scrofulous skin affections and glandular swellings. Seeds—astringent. Used for dysentery.

The root contains anthraquinones (about 2.17–4%) including nepodin, and other glycosides based on chrysophanol, physcion and emodin; also tannins, rumicin and oxalates. Large doses should be avoided. Disturbances caused by the plant are attributed to rumicin. The root and rhizome are reported to stimulate bile production. (*Natural Medicines Comprehensive Database,* 2007.)

The leaves contain 30 mg/100 g ascorbic acid.

R. crispus is pharmacologically more active than rhubarb, because the extracts of the roots of the former contain more quantity of anthraquinones (2.17%) than the extracts of the latter (1.42%).

It has been suggested that Amlavetas should be equated with *R. crispus*.

Rumex dentatus Linn.

Family ▶ *Polygonaceae.*

Habitat ▶ The Himalayas up to 300 m, and in the plains from Assam to Western and Southern India.

Folk ▶ Jangali Paalak.

Action ▶ Plant—astringent; used in cutaneous disorders.

The leaves contain vitamin C 115 mg and vitamin A value 11,700 IU/100 g and are a rich source of calcium and beta-carotene. The dried leaves contained 7.8% of flavonoids and 0.04% of anthraquinone derivatives. Flavonoids include rutin, avicularin, quercitrin, quercetin. Roots contain chrysophanic acid and emodin, the total anthraquinone content being 0.13%.

Rumex hastatus D. Don.

Family ▶ *Polygonaceae.*

Habitat ▶ Western Himalayas from Kumaon to Kashmir, between 300–2,400 m.

Folk ▶ Amlora, Chumlora (Kumaon); Khattimal, Katambal (Punjab).

Action ▶ Astringent.

The root and bark yield 21–23% tannin.

Rumex maritimus Linn.

Family ▶ *Polygonaceae.*

Habitat ▶ The temperate Himalayas, Assam, Bengal, Western Ghats and the Nilgiris.

English ▶ Golden Dock.

Ayurvedic ▶ Kunanjara.

Unani ▶ Seeds—Beejband, (siyah or safed), Jangali Paalak.

Action ▶ Leaves—catharitic; externally applied to burns. Seeds—incorporated in sex-tonics as aphrodisiac. (Seeds of *Sida cordifolia* and *Abutilon indicum* are also used as Beejband.) Roots are used as a substitute for rhubarb.

The leaves contain anthraquinones both in free and bound forms. The fruits contain rumarin (0.12%) rutin and hyperin. The seeds contain 5.1% tannin.

The roots are purgative; contain chrysophanic acid, saccharose and tannin (6%).

The seeds and leaves contain rumarin, rutin, hyperin, chrysophanic acid, charose, tannin, emodin and its monoethyl ether, beta-sitosterol and its glucoside.

Rumex nepalensis Spreng.

Family ▶ *Polygonaceae.*

Habitat ► The temperate Himalayas, Western Ghats and the Nilgiris.

Folk ► Kulli (Kumaon).

Action ► Root—purgative. A substitute for *Rheum palmatum*. Leaves—an infusion is given in colic, externally applied to syphilitic ulcers.

The roots contain nepodin, chrysophanic acid, also 12.8% tannin.

Rumex scutatus Linn.

Family ► *Polygonaceae.*

Habitat ► Western Himalayas up to an altitude of 2,400 m.

English ► French Sorrel.

Action ► Plant—refrigerant, astringent; given in dysentery. Juice of leaves—antiscorbutic.

The roots contain oxymethyl anthraquinone.

R

Rumex vesicarius Linn.

Family ► *Polygonaceae.*

Habitat ► Native to South-west Asia and North Africa; cultivated all over India, especially in Tripura, West Bengal and Bihar.

English ► Bladder-Dock, Country Sorrel.

Ayurvedic ► Chukra, Chuko, Chakravarti.

Unani ► Hammaaz.

Siddha/Tamil ► Shakkankeerai.

Action ► Plant—astringent antiscorbutic, stomachic, diuretic, used for disorders of lymphatic and glandular system; for bronchitis, asthma; constipation, dyspepsia, diseases of liver and spleen; urinary and renal disorders; alcoholism. Seeds—antidysenteric.

Anthraquinone glucosides, emodin and chrysophanol, have been reported from leaves, root and seeds. The leaves contain large amounts of oxalate (21.8% on dry basis); vitamin C content is 12 mg and vitamin A 6,100 IU/100 g.

The leaves of Rumex species are eaten in salad or cooked like spinach. They contain protein, carbohydrates, potassium, magnesium, phosphorus, calcium, manganese, copper, zinc, (iodine, in some samples), ascorbic acid, beta-carotene and thiamine; also oxalic acid, potassium binoxalate and some tartaric acid.

Rungia pectinata (L.) Nees.

Synonym ► *R. parviflora* (L.) Nees var. *pectinata* C. B. Clarke. *Justicia pectinata* L.

Family ► *Acanthaceae.*

Habitat ► Throughout India, in waste places and hedges.

Ayurvedic ► Parpata (as adulterant).

Siddha/Tamil ► Punakapundu.

Action ► Leaves—juice is aperient, febrifuge, refrigerant; bruised leaves are applied externally to disperse swellings. Root—febrifuge. The juice of leaves is given to children suffering from smallpox.

Rungia repens Nees.

Family ► *Acanthaceae.*

Habitat ► Throughout India as a weed in moist places.

Ayurvedic ► Parpata (substitute).

Siddha/Tamil ► Kodaga-saleh.

Folk ► Kharmor.

Action ► Herb—vermifuge, diuretic; dried and pulverized herb is used for cough and fever. Fresh, bruised leaves, mixed with castor oil, are applied to scalp to cure *tinea capitis* (a scaly fungoid infection).

The flavonoid pigments in ivory-white and pale yellow flowers (the plant also bears blue and pink flowers) showed the presence of luteolin and chrysoerial (3′-O-methyl luteolin) and their glucosides. Deep yellow flowers contain isosalipurposide; the bluish pink flowers showed presence of delphinidin-3,5-diglucoside.

Ruscus aculeatus Linn.

Family ► *Liliaceae; Ruscaceae.*

Habitat ► Native to western Europe, Mediterranean region and Iran; widely grown as ornament in India.

English ► Butcher's Broom, Jew's Myrtle.

Action ► Rhizomes—deobstruent, anti-inflammatory, haemostatic.

Key application ► As supportive therapy for discomforts of chronic venous insufficiency and for complaints of hemorrhoids.(*German Commission E, ESCOP.*)

Aqueous-alcoholic extract of the rhizomes contains steroid saponins (up to 6% of the extract). The spirostanol glycosides, degluconeoruscin and deglucoruscin from the extract are absorbed in human plasma after oral administration. Besides, the rhizomes contain two furastanol glycosides, degluconeoruscoide and deglucoruscoside. The extract is used for the treatment of venous insufficiency and enters into dermatological and cosmetic compositions for the treatment of dark skin under the eye and into anti-ageing and anti-sun-tanning preparations.

Ruta chalepensis Linn.

Family ► *Rutaceae.*

Habitat ► Native to Southern Europe and North Africa; cultivated in Indian gardens. (Most of the reports of the Garden Rue, cultivated in India, refer to this species and not to *Ruta graveolens.*)

Unani ► Jangali Sudaab.

Siddha/Tamil ► Aruvadam-chedi, Arvada.

Action ► Plant—antispasmodic, sudorific. Stimulates the nervous system; commonly used in decoction in convulsions and fever. Also used as a fumigant in infant catarrh.

The plant gave an essential oil which contains chiefly methyl heptyl ketone (while *Ruta graveolens* contains 80–90% methyl nonyl ketone and methyl heptyl ketone in small amounts). Rutin is the most important active principle

of the plant, responsible for its anti-inflammatory and tumour-inhibiting effect.

Ruta graveolens Linn.

Family ► *Rutaceae.*

Habitat ► Native to Mediterranean region; cultivated all over India.

English ► Garden Rue.

Unani ► Sudaab, Suddaab.

Siddha/Tamil ► Aruvada.

Action ► Herb—stimulating, antispasmodic, stomachic; irritant, abortifacient. Used as an emmenagogue, in hysterical conditions, cough and croupy affections, colic and flatulence. Leaf—used in atonic amenorrhoea, menorrhoea and colic. Externally, used for sciatica, headache, muscular chest pain, bronchitis and arthritic conditions. (Fresh juice of leaves, internally, can lead to painful irritations of the stomach and intestines). Oil—antispasmodic, antiepileptic, emmenagogue, rubefacient. (Toxic in large doses.)

Ruta graveolens has been included among unapproved herbs by *German Commission E.*

The herb contains a volatile oil, with 2-undecanone (30.73) 2-nonanone (18.06), 2-nonyl acetate (11.03), psoralen (1.28) and bergapten and xanthotoxin (7.24%); rutin (about 2%). The flavonoids include quercetin; coumarins include bergapten, daphnoretin, isoimperatorin, naphthoherniarin, psoralen, pangelin, rutamarin, rutarin, scopoletin and umbelliferone. Tissue culture of the plant gave furacridone alkaloids. Tissue culture of the root gave gravacridondiol and its glucoside.

The spasmolytic activity of the herb is attributed to the presence of bergapten, xanthotoxin and the essential oil. Anti-inflammatory and antitumour activity is due to rutin. The furocoumarins are responsible for the herb's phototoxicity.

The herb is hepatotoxic, and is contraindicated in kidney diseases and bleeding disorders. (Sharon M. Herr.) Maximum safe level is 0.001% for Rue and 0.0002% for the oil. (*Natural Medicines Comprehensive Database,* 2007.)

S

Saccharum munja Roxb.

Synonym ► *S. sara* Roxb.
S. bengalense Retz.
Erianthus munja Jesw.

Family ► *Gramineae; Poaceae.*

Habitat ► Throughout the plains and low hills of India.

Ayurvedic ► Munja, Bhadramuja, Vaana, Shara, Sara, Raamshara.

Siddha/Tamil ► Munjipul, Munjappullu.

Folk ► Sarpata.

Action ► Refrigerant. Useful in burning sensation, thirst, dyscrasia, erysipelas and urinary complaints.

The Ayurvedic Pharmacopoeia of India recommends the use of the root in dysuria, giddiness and vertigo.

The stem is a good source of furfural (yield 5.67%, dry basis). It yields 19.5% (on dry weight) of reducing sugars when digested with sulphuric acid; glucose, xylose, galactose and rhamnose have been identified in the hydrolysate which contains 34.5% fermentable sugars. (It can be used as a potential source of alcohol.)

In Kerala, *Saccharum arundinaceum* Retz. is used as Shara for dysuria, diseases due to vitiated blood, erysipelas, leucorrhoea and piles. The grass is known as Raamshara in North India. It can also be used for the production of furfural (yield 5.1% dry basis) and yields 24.1% of reducing sugars when digested with sulphuric acid. The hydrolysate contains 65% of fermentable sugars, viz. glucose, xylose, galactose and rhamnose.

Dosage ► Root—20–50 g for decoction; 6–10 g powder. (*API*, Vol. III.)

Saccharum officinarum Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Uttar Pradesh, Bihar and Punjab.

English ► Sugarcane, Noble Cane.

Ayurvedic ► Ikshu, Dirgha-chhada, Bhuurirasa, Morata, Asipatra, Madhutrna, Gudamuula, Trnarasa.

Unani ► Gannaa, Naishakar.

Siddha/Tamil ► Karumbu, Nanal.

Action ► Cane Juice—restorative, cooling, laxative, demulcent, diuretic, antiseptic. Used in general debility, haemophilic conditions, jaundice and urinary diseases.

The Ayurvedic Pharmacopoeia of India recommends the juice of the stem in haemorrhagic diseases and anuria; and the root in dysuria.

Sugarcane juice contains surcose (70–80% of soluble solids in the juice), glucose and fructose. Non-sugar constituents present in the cane juice are carbohydrates other than sugars. Asparagine and glutamine are prominent amino acids in the juice. Other

amino acids include alanine, gamma-amino butyric acid, aspartic and glutamic acids, glycine, leucine, lysine, serine and tyrosine. The presence of phenylalanine, histidine, valine, proline, threonine and arginine, pipecolic acid, methionine and tryptophan has also been reported.

Aconitic acid constitutes about three-fourths of the total carboxylic acid present in the juice.

Vitamins present in the juice are: thiamine, riboflavin, niacin, pantothenic acid, biotin, and vitamin D; enzymes include diastase, invertase, lactase, peroxidase, tyrosinase.

Phenols in the cane juice are mainly polyphenols from tannin and anthocyanin from the rind.

Cane juice contains glycolic acid which improves skin complexion as it has antiwrinkle effect, prevents scaly growth and increases natural collagen and elastin in the skin.

Enzymes present in the seeds include large quantities of diastase and invertase.

An ester, vanilloyl-1-O-beta-D-glucoside, has been isolated from the bagasse.

The leaves contain alpha-amylase and glutathione-S-transferase.

Dosage ► Stem—200–400 ml juice; rootstock—15–30 g for decoction. (*API,* Vol. IV.)

Saccharum spontaneum Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Throughout India.

English ► Thatch Grass.

Ayurvedic ► Kaasha, Kandekshu, Shvetachaamara.

Siddha/Tamil ► Naanal, Pai Karumbu.

Action ► Plant—cooling, astringent, diuretic, galactagogue. Used in the treatment of burning sensation, dysuria, dyscrasia, kidney and bladder stones, dysentery, bleeding piles. Root—diuretic, galactagogue.

Ayurvedic Pharmacopoeia of India recommends the root in calculus, dysuria and haemorrhagic diseases.

Dosage ► Root—3–6 g powder. (*API,* Vol. III.)

The Five-Grassroots *(Tripanchmuula)* of Ayurvedic medicine contain extracts of *S. munja, S. officinarum* and *S. spontaneum.* The compound is prescribed as a diuretic.

Saccolabium papillosum Lindl.

Family ► *Orchidace.*

Habitat ► The outer range of Himalayas from Uttar Pradesh eastwards to Sikkim and Assam.

Ayurvedic ► Naakuli (substitute), Vrkshaadani (var.).

Folk ► Raasanaa, Naakuli, Gandhalataa.

Action ► Roots—used for rheumatism.

An alkaloid and a bitter resin has been reported in the plant.

Roots are used as a substitute for Sarsaparilla (*Hemidesmus indicus*).

Sagittaria trifolia Linn.

Synonym ► *S. sagittifolia* Hook. f. (non L.)

Family ► *Alismataceae.*

Habitat ► Throughout the plains of India.

English ► Old world Arrowhead.

Folk ► Chhotaa Kuuta, Muyaa (Bengali).

Action ► Plant—discutient, anti-galactagogue, astringent, anti-inflammatory. Tuber—used for cutaneous diseases. Leaves—powder dusted in pruritus; mashed with molasses used in sore throat and inflammation of the breasts.

The plant contains a diterpene, sagittariol, beta-sitosterol, its glucoside and hentriacontanone. The diterpenes, trifoliones A, B, C and D, inhibited histamine release from rat mast cells.

The bulbs contain sandaracopimaric acid which suppressed the immune function of animal T-cells.

Salacia chinensis Linn.

Synonym ► *S. prinoides* DC.

Family ► *Hippocrateaceae; Celastraceae.*

Habitat ► A large, climbing shrub or small tree occurring throughout India, including the Andaman Islands.

English ► Saptrangi.

Ayurvedic ► Saptachakraa, Swarn-muula, Saptarangi.

Folk ► Ingali (Maharashtra), Modhuphal (Bengal), Cherukuranti (Kerala).

Action ► Roots—used in diabetes. Also used for amenorrhoea, dysmenorrhoea and genito-urinary and venereal diseases.

The root bark contains proanthocyanidins, consisting of monomeric leucopelargonidin, its monomer, dimer and tetramer; triterpenoids (friedelin and its derivatives), mangiferine, phlobatannin, and glucosidal tannins.

The stem yielded gutta, dulcitol and proanthocyanidin consisting of dimer of leucopelargonidin.

Dosage ► Root—50–100 ml decoction. (*CCRAS.*)

Salacia macrosperma Wight.

Family ► *Hippocrateaceae; Celastraceae.*

Habitat ► The Western Ghats, from Konkan southwards.

Folk ► Lendaphala (Maharashtra), Anakoranti (Kerala).

Action ► Root—decoction is given after parturition. Leaves—applied to eczema.

A decoction of the roots of *S. grandiflora* Kurz, synonym *S. longifolia* Hook. (the Andamans) and *S. macrophylla* Blume, synonym *S. flavescens* Kurz and *S. ovalis* M. Laws. (Konkan and the Andamans) is also given after parturition.

Salacia oblonga Wall. ex Wight & Arn.

Family ► *Hippocrateaceae; Celastraceae.*

Habitat ► Rain forests of Western Ghats from Konkan to Kerala.

Folk ► Chundan (Tamil Nadu), Ponkoranti (Kerala).

Action ► Root bark—used for the treatment rheumatism; also for gonorrhoea, swellings and skin diseases. Plant—mildly antiseptic.

Salacia reticulata Wt.

Family ► *Hippocrateacea; Celastraceae.*

Habitat ► Orissa, Andhra Pradesh, Kerala.

Folk ► Ekanyakam, Koranti (Kerala, South India), Anukudu-chettu (Andhra Pradesh)

Action ► Plant—mild antiseptic. Root bark—used against gonorrhoea, skin diseases and inflammations. The root bark exhibits hypoglycaemic activity.

Salicornia brachiata Roxb.

Family ► *Chenopodiaceae.*

Habitat ► Sea coast from Bengal to Gujarat.

Folk ► Kohlu (Andhra Pradesh).

Action ► Ash—used in mange and itch.

Air-dried plant contains 8.97% ash; a high percentage of sodium and chloride ions (sodium 5.68, chloride 10.02%). The plant is a source of alkaline earth (called Sajji), used for extracting sodium carbonate.

Salix acmophylla Boiss.

Family ► *Salicaceae.*

Habitat ► Sub-Himalayan tracts from Uttar Pradesh westwards ascending to an altitude of 1,800 m.

Ayurvedic ► Jala-vetasa.

Action ► Bark—febrifuge.

Salix alba Linn.

Family ► *Salicaceae.*

Habitat ► North-western Himalayas, up to an altitude of 2,400 m.

English ► White Willow, European Willow.

Ayurvedic ► Jalavetasa.

Unani ► Bed Saadaa.

Folk ► Vivir (Kashmir).

Action ► Analgesic, anti-inflammatory, febrifuge. Used for rheumatic inflammation, painful muscles, spondylitis, lumbago, sciatica, neuralgia, gout and fever. (In 1838, chemists identified salicylic acid in the bark. Afterwards, synthesized it as acetylsalicylic acid, aspirin, in 1899.)

Key application ► In diseases accompanied by fever, headache,

rheumatic ailments. (*German Commission E.*) *The British Herbal Pharmacopoeia* reported anti-inflammatory action. The *British Herbal Compendium* additionally reported analgesic, antipyretic, antirheumatic and astringent actions of the willow bark.

The bark contains phenolic glycosides; salicin, picein and triandrin with esters of salicylic acid and salicyl alcohol, acetylated salicin, salicortin and salireposide; tannins; catechin; *p*-coumaric acid; flavonoids and polysaccharides.

Salicylic acid inhibits prostaglandin production, relives pain and brings down fever.

Salix babylonica Linn.

Family ► *Salicaceae.*

Habitat ► North India, along the banks of rivers nad water-courses.

English ► Weeping Willow.

Siddha/Tamil ► Aatru Paalai.

Folk ► Giur (Kashmir). Bed.

Action ► Leaves and bark—astringent, antipyretic. Used in intermittent and remittent fevers. Bark—anthelmintic. Biological activity of aerial part—antiviral, CNS active, hypothermic.

The leaves are reported to contain delphinidin and cyanidin, fragilin, salicin, salicortin, salidroside, tremuloidin, triandrin and vimalin. Salicin content in the stems and leaves is reported to be 3 to 4%. The bark yields phenolics—triandrin, salicin, gallocatechol, catechol.

Salix caprea Linn.

Family ► *Salicaceae.*

Habitat ► Kashmir, Punjab, Himachal Pradesh and Uttar Pradesh.

English ► Sallow, Goat Willow, Common Willow.

Ayurvedic ► Vetasa, Vaanira, Vidula, Vanjula, Vaanjulaa. In Kerala *Homonoia riparia* Lour., *Euphorbiaceae,* is used as Vetasa or Jalavetasa.

Unani ► Bed Mushk.

Action ► Distilled water from flowers—cordial, stimulant; externally applied to headache. Stem and leaves—astringent. Leaves—decoction used as febrifuge. Bark and twigs—astringent, applied to piles. Ash of wood—used in haemoptysis; mixed with vinegar, applied to piles.

Alkaloids, glycosides and saponins of male racemes increase the amplitude and slow the heartbeat and act more rapidly than digitalis on isolated frog heart.

Flavonoids present in the male racemes are: diometin, isorhamnetin, capreoside and salicapreoside.

Phenol glycosides present in the bark are: delphinidin, cyanidin, pipecolic acid, fragilin, picein, salicin, salicortin, salireproside, triandrin and vimalin. Tannin content is reported to be 8–13%.

Salix daphnoides Vill. and *Salix elegans* Wall. (The Himalayas from Kash-

mir to Nepal) are also known as Jalavetasa.

Dosage ► Leaf, bark, root—50–100 ml decoction. (*CCRAS.*)

Salix fragilis Linn

Family ► *Salicaceae.*

Habitat ► Cultivated in Kashmir and Himachal Pradesh.

English ► Crack Willow, Kashmir Willow.

Folk ► Tilachaang (Himachal Pradesh).

Action ► Bark—antirheumatic.

Key application ► For relief of low back pain; symptomatic relief of mild osteoarthritic and rheumatic complaints. (*ESCOP.*) The bark contains salicin 0.23%, salicase and tannin (6–12%).

The phenol glycosides reported from the plant include fragilin, glycosmin, grandidentatin, picein, populin, salicin, salireposide, salicyloyl tremuloidin, triandrin and tremuloidin.

Willow bark consists of the dried bark or twigs of various species of the genus *Salix,* including *S. purpurea* L. and *S. daphnoides* Vill.

Salicylate concentrations vary greatly among *Salix* sp. *Salix alba* bark is reported to contain 0.49–0.98% salicin; *Salix purpurea* bark 3–9%, *Salix daphnoides* bark 4.9–5.6% and *Salix fragilis* bark 3.9–10.2%. (*Natural Medicines Comprehensive Database,* 2007.)

Salix nigra Marsh.

Family ► *Salicaceae.*

Habitat ► Native to America (New York and Pennsylvania).

English ► Black Willow.

Unani ► Bed-Siyaah.

Action ► Astringent, febrifuge, sedative, nervine tonic. Anaphrodisiac (used for reducing sexual activity; in spermatorrhoea). Largely used in the treatment of nocturnal emissions.

The bark contains tannin, about 1% of glucoside salinigrin. Once considered a substitute for potassium bromide, but without a depressant effect.

Salix tetrasperma Roxb.

Family ► *Salicaceae.*

Habitat ► Throughout the greater part of India, along the banks of rivers and streams.

English ► Indian Willow.

Ayurvedic ► Jalavetasa, Naadeya, Niketan, Baishi.

Siddha/Tamil ► Attupalai.

Folk ► Vaanira, Vaalunja.

Action ► Dried leaves—anti-inflammatory, given in rheumatism, swellings, piles. Bark—febrifuge.

The bark is reported to contain 6.5% tannin, also salicin A.

Salix viminalis Linn. (The Himalayas from Kashmir to Sikkim) is known as Basket Willow and the Osier.

The bark contains 8.2%–8.8% tannin and phenol glycosides, fragilin, picein, salicin (0.13%), salicortin, salireposide, triandrin and vimalin. Salicase, and calcium and potassium nitrates are also reported from the bark.

Dosage ► Bark—59–100 ml decoction. (*CCRAS.*)

Salmalia malabarica (DC) Schott & Endl.

Synonym ► *Bombax ceiba* Linn. *Bombax malabaricum* DC. *Gossampinus malabarica* (DC.) Merr.

Family ► *Bombacaceae.*

Habitat ► The hotter parts of India, up to 1,350 m.

Ayurvedic ► Shaalmali, Mochaa, Mochaahva, Pichhila, Raktapushpa, Sthiraayu, Kankataadhya, Tuulini. Shaalmali-veshtaka (gum).

Unani ► Semal. Mochras (gum).

Siddha ► Mul Ilavam. Ielavampisin (gum).

Folk ► Semar.

Action ► Young roots (Semul-musali)—astringent, (used for dysentery) stimulant, demulcent. Fruits—stimulant, diuretic, expectorant. Used for chronic inflammation of bladder, kidney also for calculus affections. Flowers—astringent and cooling, applied to cutaneous affections. Leaves—anti-inflammatory. Stem bark—demulcent, styptic. Aqueous extract with curd is given for blood-dysentery. Bark—paste is applied to skin eruptions, boils, acne, pimples. Seeds used for chickenpox, small-pox, catarrhal affections, chronic cystitis and genitourinary diseases. Gum—astringent, demulcent, styptic. Used for diarrhoea, dysentery, haemoptysis, bleeding piles, menorrhagia, spermatorrhoea. Root and pod—used for the treatment of low vitality and debility.

The Ayurvedic Pharmacopoeia of India recommends the stem bark in bleeding disorders and in acne vulgaris.

All parts of the plant gave beta-sitosterol and its glucosides; seeds, bark and root bark, lupeol; flowers, hentriacontane, hentriacontanol; root bark, in addition, gave 7-hydroxycadalene. The seed oil yields arachidic, linoleic, myristic, oleic and palmitic acids; seeds contain carotenes, *n*-hexacosanol, ethylgallate and tocopherols; the gum contains gallic and tannic acids, yields L-arbinose, D-galactose, D-galacturonic acid and D-galactopyranose.

Younger roots contain more sugars (arabinose and galactose 8.2%) and peptic substances (6.0%) than the older ones. They contain mucilage, starch (71.2%), mineral matter (2.1%), tannins 0.4 and non-tannins 0.1%, along with other constituents.

The Musali compares favourably with the nutritive value of *Pueraria tuberosa, Dioscorea bulbifera, Ipomoea digitata* and *Butea monosperma* (all used in sexual debility).

A related species, *Salmalia insignis* (Wall.) Schott & Endl., synonym

S

Bombax insigne Wall. (Assam, Western Ghats and the Andamans); is known as Semul; Dumboil (Assam), Didu (Andamans) and Kal-ilavu (Tamil Nadu).

Dosage ► Stem bark—5–10 g powder. (*API,* Vol. III.) Flower, bark root—3–5 g powder. (*CCRAS.*)

Salsola kali Linn.

Family ► *Chenopodiaceae.*

Habitat ► North-West Himalayas and Kashmir.

English ► Glass-Wort, Russian Thistle, Prickly-Saltwort.

Ayurvedic ► Sarjikaa, Katol, Laanaa-buuti, Sajji-buuti.

Unani ► Ushnaan, Ghaajuraan.

Folk ► Barilla.

Action ► Plant—cathartic. Juice of fresh plant and seed-vessels—a potent diuretic. Ash of the plant is used in Unani medicine.

Alcoholic extract of the plant showed antimicrobial activity against *Salmonella paratyphi* and *Serratia marcescens.*

Salvadora oleoides Dcne.

Family ► *Salvadoraceae.*

Habitat ► The arid regions of Punjab, Rajasthan and western India.

Ayurvedic ► Pilu (bigger var.).

Siddha ► Kalawa (Tamil).

Action ► Leaf—bechic. Bark—vesicant. Fruit—febrifuge (in low fever), used in enlarged spleen. Oil from seed—applied in rheumatic affections and after child birth.

The fruit contains sterols, beta-sitosterol and its glucosides and stigmasterol; benzylisothiocyanate, *n*-octacosanol and tetracosane; flavonoids including quercetin and rutin; thiourea derivatives and phospholipids. Myristic, lauric and palmitic acids were obtained from the seed fat.

Salvadora persica Linn.

Synonym ► *S. persica* L. var. *wightiana* Verde.
S. indica Wt.

Family ► *Salvadoraceae.*

Habitat ► Arid regions, on saline lands and in coastal regions.

English ► Mustard tree. Salt Bush tree, Tooth Brush tree.

Ayurvedic ► Pilu (smaller var.), Pilukaa, Sransi, Angaahva, Tikshna-vrksha.

Unani ► Miswaak, Araak.

Siddha ► Perungoli.

Action ► Fruit—carminative (used in biliousness), deobstruent (used for rheumatism, tumours, splenomegaly), diuretic, lithotriptic. Leaves—decoction used for cough and asthma, poultice in painful piles and tumours; juice in scurvy. Flowers—stimulant, laxative. Applied in painful rheumatic conditions. Seeds—diuretic; purgative; fatty

oil applied locally on rheumatic swellings. Root bark—topically vesicant. Bark—emmenagogue, ascarifuge, febrifuge. Biological activity of stem bark—spasmolytic. Plant—anti-inflammatory, hypoglycaemic, antibacterial.

The root gave elemental gamma-monoclinic sulphur, benzyl glucosinolate, salvadourea (a urea derivative), *m*-anisic acid and sitosterol. Benzyl isothiocyanate, isolated from the root, exhibits antiviral activity against *Herpes simplex virus-1* which affects oral region. (The root is used in many parts of the world as a tooth brush.) Root bark and stem bark contain trimethylamine. Myristic, lauric and palmitic acids are the major acid components of the seed fat.

Dosage ▶ Fruit—3–6 g powder; 50–100 ml decoction. (*CCRAS.*)

Salvia aegyptiaca Linn.

Synonym ▶ *S. pumila* Benth.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Arid areas from Delhi westwards in Punjab and Rajasthan, and southwards in Gujarat and Maharashtra.

Unani ▶ Tukhm-Malangaa.

Action ▶ Seeds—used for diarrhoea, also in haemorrhoids.

Seeds yield mucilage and a gum which contain aldobiuronic acid and aldotriouronic acid.

The mucilage on hydrolysis yields D-galactose, L-arabinose, L-rhamnose and galacturonic acid.

The seeds of this plant are often confused with those of *Lallemantia royeleana* Benth. which are also sold as Tukhm-Malangaa.

Salvia coccinea Linn.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Cultivated in Indian gardens.

Ayurvedic ▶ Samudrashosha (var.).

English ▶ Red Sage, Texas Sage.

Action ▶ Decoction—used in renal diseases, also for lumbago. Contraindicated during pregnancy.

Salvia haematodes Linn.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ Cultivated in Indian gardens.

English ▶ Blood-veined Sage.

Unani ▶ Behman Surkh. (Behman Safed is equated with *Centaurea behen* Linn.)

Action ▶ Both the varieties of Behman are used in Unani medicine as a cardiac and sex tonic, also as a liver tonic in jaundice.

Salvia lanata Roxb.

Family ▶ *Labiatae; Lamiaceae.*

Habitat ▶ The temperate Himalayas from Kashmir to Nepal

Folk ▶ Kuuthan-Kali.

Action ► Roots—an adulterant of *Saussurea lappa*. Used as a substitute for *Saliva moorcroftiana*.

Salvia moorcroftiana Wall. ex Benth.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Northwestern Himalayas from Kashmir to Kumaon at 2,000–3,000 m.

Folk ► Kaali-jarri (Punjab).

Action ► Root—bechic. Leaves—antitussive; applied as poultice to boils and chronic skin affections. Seeds—antispasmodic, emetic. Used for colic, dysentery, also for haemorrhoids; applied to boils.

The root gave a diterpene quinone.

Salvia officinalis Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to the Mediterranean region; grown as an ornamental.

English ► Sage.

Folk ► Salvia Sefakuss.

Action ► Plant—astringent, anti-inflammatory, carminative, antispasmodic, antiseptic. Leaf and flower—cholagogue, hypoglycaemic, antiasthmatic (used for respiratory allergy), cholagogue, emmenagogue, antisudoriferous, antiseptic. Leaf—diaphoretic, antipyretic. Used for sore throat, laryngitis, tonsillitis, stomatitis.

Key application ► Leaf—internally, for dyspeptic symptoms and excessive perspiration; externally for inflammations of the mucous membranes of nose and throat. (*German Commission E.*) *ESCOP* indicates its use for inflammations and infections such as stomatitis, gingivitis, pharyngitis, and hyperhidrosis.

The leaves contain a volatile oil; diterpene bitters including carnosolic acid; flavonoids including salvigenin, genkwanin, hispidulin, luteolin and its derivatives; phenolic acids including rosmarinic, caffeic, labiatic; a condensed catechin, salvia tannin.

The roots contain diterpene quinonesroyleanone and its derivatives. Volatile oil contains alpha-and beta-thujone, 1,8-cineole and camphor. Thujone is strongly antiseptic and carminative, also has an oestrogenic action that is partly responsible for the herb's hormonal activity in reducing breast milk production. The volatile oil also relieves muscle spasms. Rosmarinic acid, a phenol, allays inflammations.

Cirsiliol, linalool and alpha-terpineol, constituents of the volatile oil, exhibit CNS depressant activities.

In a double blind, randomized and placebo controlled trial, extracts of *Salvia officinalis* showed improvement in patients with mild to moderate Alzheimer disease. (*Natural Medicines Comprehensive Database,* 2007.)

Sage oil is used in perfumes as a deodorant and for the treatment of thrush and gingivitis. The herb is used in tooth powders, mouth washes, gargles,

poultices, hair tonics and hair dressings.

Salvia plebeia R. Br.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Throughout the plains of India, up to 1,500 m in the hills.

Ayurvedic ► Samudrashosha, Kammarkasa.

Folk ► Bhuu-Tulasi.

Action ► Plant—diuretic, anthelmintic, astringent, demulcent. Leaves—used for toothache. Seeds—mucilaginous, used for diarrhoea, leucorrhoea, menorrhagia and haemorrhoids.

The plant contains flavones—nepetin and hispidulin and their glucosides. Flowers also contain nepetin. Sitosterol and oleanolic acid are also present. The seeds yield secoisolariciresinol diester.

Salvia spinosa Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native of Baluchistan. (Used in Unani medicine.)

Unani ► Kanochaa, Marv. Seeds—Tukhm Kanochaa, Tukhm Marv. (*National Formulary of Unani Medicine* equated Kanochaa with *Phyllanthus maderaspatensis* Linn.)

Action ► Used for colic and as an intestinal tonic, deobstruent and disinfectant. Roasted or processed seeds are prescribed in diarrhoea and dysentery.

Salvinia cucullata Roxb.

Family ► *Salviniaceae; Azollaceae.*

Habitat ► Throughout India in shallow, freshwater lakes, ponds, ditches.

Ayurvedic ► Aakhukarni (Kerala). (Suggested by Rashtriya Ayurveda Vidyapeeth.)

Action ► Root—digestive, diuretic, febrifuge, anthelmintic. Used for epistasis, fever and colic. Also for dysuria, polyuria and skin diseases.

In Kerala, *Merremia emarginata* (*Convolvulaceae*) or *Hemionitis arifolia* (*Cheilanthaceae*) are used as Aakhukarni.

Salvinia is an aquatic fern, rich in protein, minerals, chlorophyll and carotenoids. Its extract exhibited strong antifungal activity against *Fusarium nivale.*

Sambucus ebulus Linn.

Synonym ► *S. wightiana* Wall. ex W. & A.

Family ► *Caprifoliaceae.*

Habitat ► Kashmir at 2,000–3,600 m.

English ► Dwarf Elder.

Unani ► Khamaan Saghir, Khamaan-ul-Arzaa, (Nabli) Khamaan.

Siddha/Tamil ► Mushkiyaara (Punjab), Khamman, Ganhulaa.

Action ► Diuretic, expectorant. Used for kidney and bladder torpor.

Lipid fraction of drupes contains unsaturated fatty acids, sterols, aliphatic alcohols, triterpenic alcohols, alpha- and beta-amyrin; also anthocyanin pigments, phenolic acids. The root contains beta-sitosterol and alpha-amyrin. Aqueous extracts induced diuresis in rats and exhibited hypotensive activity in cats. The extract of flowering herb showed significant antiulcerogenic activity.

cyanogenic glycosides; berries contain flavonoids, anthocyanins, vitamin A and C.

Anti-inflammatory activity of the flowers has been attributed to ursolic acid. Elder flowers and peppermint is an old remedy for influenza in the Western herbal.

The berry is used against influenza virus A and B. (*J Alt Compliment Med,* 1(4), 1995.)

Sambucus nigra Linn.

Family ► *Caprifoliaceae.*

Habitat ► Kangra and in Simla hills.

English ► European Elder, Black Elder.

Unani ► Khamaan Kabir.

Action ► Anti-inflammatory, anticatarrhal, diuretic. Flowers and berries—used for common cold, influenza, nasal catarrh, sinusitis; as a gargle in sore throat. Inner bark—cathartic, hydragogue, emetic, diuretic. Infusion of bark and flowers—given in epilepsy; also used as a gentle circulatory stimulant, diaphoretic, expectant and anticatarrhal; locally in inflammations.

Key application ► In colds, also as a diaphoretic and anticatarrhal. (*German Commission E, The British Herbal Compendium, WHO.*)

The flowers contain triterpenes including ursolic acid; flavonoids (up to 3%) including rutin; phenolic acids; triterpenes; sterols; tannins; mucilage; volatile oil (up to 0.2%); leaves gave

S

Sandoricum indicum Cav.

Synonym ► *S. koetjape* (Burm. f.) Merrill.

Family ► *Meliaceae.*

Habitat ► Wild in Kangra and in Simla hills.

English ► European Elder.

Siddha/Tamil ► Sevai, Sayai.

Action ► Root—astringent, carminative, antispasmodic. Used for diarrhoea. Bark—anthelmintic.

Fruit hulls gave bryonic and bryonolic acids, mesoinosital and dimethyl mucate; heartwood also gave triterpenic acids including katonic and indicic acid.

The seeds gave limonoids—sandoricin and 6-hydroxysandoricin. A secotriterpene, koetjapic acid, together with katonic acid, has been isolated from the stem. Sandoricin and 6-hydroxysandoricin exhibited effective antifeedant activity. Katonic acid exhibited significant cytotoxicity against a variety of cultured human cancer cells.

Sanicula europaea Linn.

Family ► *Umbelliferae.*

Habitat ► Europe, including Britain. The Himalayas from Kashmir to Bhutan, Assam, Western Ghats and Palni hills in South India.

English ► Wood Sanicle.

Action ► Plant—astringent, alterative, vulnerary. Used in leucorrhoea, menorrhagia, bleeding piles; also in diarrhoea and dysentery. The herb is also employed as an ingredient of an ointment used for septic ulcers.

The herb contains saponins based on saniculogenins; allantoin; chlorogenic and rosmarinic acids. The flowers contain 3.1 and fruits 1.1% rosmarinic acid. The leaves contain 0.6% chlorogenic acid. The roots contain 23.1, leaves 12.8, flowers 6.0 and fruits 5.2% surcose. Rhizome contains chlorogeni acid 1.2 and sucrose 13.9%.

Sansevieria hyacinthoides (Linn.) Druce.

Synonym ► *S. zeylanica* (L.) Willd.

Family ► *Liliaceae.*

Habitat ► Native to Sri Lanka; found along coastal regions of India from Bengal to Tamil Nadu.

English ► Ceylon Bowstring Hemp.

Ayurvedic ► Naagadamani (related species) (also known as Muurvaa).

Siddha/Tamil ► Marul, Motta manji.

Action ► See *S. roxburghiana.* Leaves and rhizomes are applied externally in high fever with delirium. Rhizomes—diuretic, diaphoretic, expectorant.

The leaf contains aconitic acid; the root yielded an alkaloid sansevierine (0.018%).

Sansevieria roxburghiana J. & J. Schultes

Synonym ► *S. zeylanica* auct. non-(L.) Willd.

Family ► *Liliaceae.*

Habitat ► The eastern coast of India from West Bengal to Tamil Nadu in South.

English ► Indian Bowstring Hemp.

Ayurvedic ► Naagadamani, Takshaki. Used in West Bengal as a substitute for Muurvaa.

Siddha ► Marul, Motta Manji (Tamil).

Action ► Rhizomes—mucilaginous, used for cough. Tender shoots—juice given to children for clearing phlegm from the throat. Whole plant—finds application in glandular enlargement and rheumatism.

Care must be taken that the herb does not accumulate in the system.

The plant must not be confused with Indian Hemp (*Cannabis indica*).

Santalum album Linn.

Family ► *Santalaceae.*

Habitat ► Dry regions of Peninsular India from Vindhya mountains

southwards, especially in Karnataka and Tamil Nadu.

English ► White Sandalwood.

Ayurvedic ► Chandana, Shvetachandana, Shrikhanda, Bhadra-Shree, Gandhsaara, Malayaja, Hima, Ekaangi.

Unani ► Sandal Safed, Sandal-e-Abyaz.

Siddha/Tamil ► Chandanam, Sandana, Ingam.

Action ► Cooling, diaphoretic, diuretic, expectorant, antiseptic and bacteriostatic against Gram positive bacteria. Used as a urinary antiseptic in chronic cystitis and sexually transmitted diseases. A paste is applied to temples in headache, during fevers and on burns, local inflammations and skin diseases (to allay pruritus). Essential oil—antibacterial, antifungal. Used as urinary antiseptic in dysuria, urethral discharges and diseases of gallbladder.

S

Key application ► In adjuvant therapy of infections of the lower urinary tract. Contraindicated in the diseases of the parenchyma of the kidney. (*German Commission E.*)

The bark contains a triterpene—*urs*-12-*en*-3 butyl-palmitate. Chief constituents of the essential oil from heartwood are alpha-and beta-santalol. Other constituents include sesquiterpene hydrocarbons—alpha-, beta-, *epi*-beta-santalene and alpha-and beta-curcumene and beta-farnesene. Dihydroagarofuran is also present in the essential oil.

Dosage ► Heartwood—3–6 g powder. (*API,* Vol. III.)

Santolina chamaecyparissus Linn.

Family ► *Compositae.*

Habitat ► Mediterranean region. Grown as an ornamental on the hills of South India.

English ► Lavender Cotton.

Action ► Plant—stomachic, antispasmodic, vermifuge, emmenagogue, analgesic, anti-inflammatory.

The herb contains flavonoids, particularly 6-methoxy flavones; pectolinarigenin, hispidulin, nepetin and an essential oil.

The extract of flowers, leaves and roots of the plant are reported to be active against Gram-positive bacteria. Anti-inflammatory effects of the herb were demonstrated in rats without ulcerogenicity or toxicity. (*Planta Medica,* 6, 1986.)

Sapindus laurifolius Vahl.

Synonym ► *S. trifoliatus* auct. non Linn.

Family ► *Sapindaceae.*

Habitat ► South India; also cultivated around villages in Madhya Pradesh, Uttar Pradesh, Bihar and West Bengal.

English ► Soapnut tree of South India.

Ayurvedic ► Arishtaka, Phenila, Raktabeeja, Reethaakaranja, Garbhapaatana.

Unani ► Reethaa.

Siddha/Tamil ► Puvamkottai, Mani pungu.

Action ► Fruit—astringent, emetic, detergent, anthelmintic. Pulp—aqueous solution used as nasal drops in migraine, epilepsy and hysteria. Root—used for gout, rheumatism and paralysis.

Saponin from pericarp of nuts yielded the genins, methylhedragenate, sapindic acid and methyl oleanolate.

Dosage ► Fruit—3–6 g powder. (*CCRAS.*)

Sapindus mukorossi Gaertn.

Family ► *Sapindaceae.*

Habitat ► Native to China and Japan; distributed in the Himalayas from Himachal Pradesh eastwards and in Assam.

English ► Chinese Soap Berry, Soap Nut tree of North India.

Ayurvedic ► Arishtaka, Phenila.

Folk ► Reethaa.

Action ► Fruits—emetic and expectorant; used in excessive salivation, chlorosis and epilepsy. The plant yielded triterpenoid glycosides, sapindosides, derived from hederagenin. Saponins exhibit hypotensive, anticholesterolemic, spermicidal and antimicrobial properties.

Saponin A and C sapindoside A and B, extracted from the fruit rind, showed antifungal activity. Hederagenin, isolated from the fruit rind or pericarp, is used in skin-lightening and anti-inflammatory cosmetics.

Other constituents from the plant are flavonoids—quercetin, kaempferol, apigenin and rutin.

Sapium indicum Willd.

Family ► Euphorbiaceae.

Habitat ► Moist parts of India, especially along sea-coasts and back waters.

Siddha/Tamil ► Pencolum.

Folk ► Hurnaa (Maharashtra).

Action ► Root bark—emetic, acrid and purgative.

The fruit contains aesculetin. A lactone and an alcohol has been isolated from the bark.

S

Sapium sebiferum Roxb.

Family ► *Euphorbiaceae.*

Habitat ► Native to China; introduced at various elevations in northern India, chiefly on ravine lands in the foothills. Planted throughout India as ornament.

English ► Chinese Tallow tree.

Folk ► Tayapippali, Vilaayati Shisham, Mom-China.

Action ► Seed oil—vulnerary, emetic, purgative; used for skin diseases and for promoting healing of wounds.

Leaves latex—vesicant. Bark—a decoction is given in dyspepsia. Resin—purgative.

Chinese vegetable tallow (of low iod. val.) is obtained from waxy mass covering the seed; the Stillingia Oil (of high iod. val.) from the kernel. The tallow from Indian trees contains 62.3% palmitic and 27.4% oleic acid. A related species, *S. discolor* Muell-Arg., introduced into the Lal Bagh Gardens, Bangalore, yields a tallow containing comparatively more oleic and less palmitic acids. Stillingia Oil is considered superior to linseed oil. The oil contains lauric, myristic, oleic, palmitic and stearic acids; the leaves contain ellagic and gallic acids, isoquercitrin and tannin 5.5%.

Ethanol extract of powdered root bark yielded 0.1% phloroacetophenone 2,4-dimethylether and menthol extract gave xanthoxyline. The bark also contains moretenone, moretenol and a triterpene, 3-*epi*-moretenol.

S

Saponaria officinalis Linn.

Family ► *Caryophyllaceae.*

Habitat ► Native to temperate region of Europe; introduced in Indian gardens.

English ► Bouncing Bet, Soapwort.

Action ► Roots—blood purifier, cholagogue, expectorant, diuretic, diaphoretic. Roots and leaves—used for scrofula and skin diseases. Sap used as a depurative for scabies, furuncles, hepatic eruptions and venereal ulcers (as a lotion). Plant—employed for jaundice (to increase bile flow); also in respiratory disorders (bronchitis, sore throat).

Key application ► Root—in catarrhs of the upper respiratory tract. (*German Commission E.*)

The plant contains saponin, sapotoxin and saponarin. The root contains sapotoxin (4–5%) and saporubrinic acid. Saponin content of the root is highest (7.7–8.2%) just before flowering stage and the lowest (about 3%) during the flowering period. The bark yield 0.8% of saponin. The leaves contain saponarin. Youngest leaves show the highest haemolytic activity.

Aqueous extract of the plant exhibit antibacterial activity.

Saponaria vaccaria Linn.

Family ► *Caryophyllaceae.*

Habitat ► Throughout India as a weed of cultivated fields of wheat and barley. Also cultivated in gardens for ornament.

Folk ► Musna, Saabuni.

Action ► See *S. officinalis*. The mucilaginous sap of the plant is febrifugal and used in chronic fevers. It is a mild depurative and used in the treatment of furuncles and scabies.

Saprosma ternatum Benth. & Hk. f. in part.

Family ► *Rubiaceae.*

Habitat ► Hills of Assam, in damp places and in the Andamans.

Folk ► Bhedeli (Assam).

Action ► Leaf—carminative, eaten to relieve flatulence and stomachache. A poultice is used after parturition.

Saraca asoca (Roxb.) De Wilde.

Synonym ► *S. indica* auct. non L.

Family ► *Caesalpiniaceae.*

Habitat ► Throughout India, except Northwestern India, up to 750 m.

English ► Ashoka tree.

Ayurvedic ► Ashoka, Ashoku, Hempushpa, Taamrapallava, Pindapushpa, Gandhapushpa. (Polyalthia longifolia Benth. & Hook. f., an ornamental roadside tree, is wrongly called Ashoka.)

Unani ► Ashoka.

Siddha/Tamil ► Asogam.

Action ► Bark—uterine tonic (imparts healthy tone to uterus), used for suppressed menses, leucorrhoea, menstrual pain, menorrhagia, complaints of menopause. Also used for dyspepsia, biliousness, colic, burning sensation. Flowers—pounded and mixed with water, used in haemorrhagic dysentery, bleeding piles and retention of urine.

The Ayurvedic Pharmacopoeia of India recommends the bark in metrohhagia, menorrhagia, chronic lymphadenitis and inflammations.

The flowers contain fatty acids and gallic acid; apigenin-7-O-beta-D-glucoside, cyanidin-3,5-diglucoside, kaempferol 3-O-beta-D-glucoside, pelargonidin-3,5-diglucoside, quercetin and its 3-O-beta-D-glucoside and sitosterol.

The bark yields alkanes, esters and primary alcohols. It gave *n*-octacosanol, tannin (6%), catechin, (+)-catechol, (−)-epicatechin, (−)-epicatechol, leucocyanidin, leucopelargonidin, procyanidin derivatives, methyl-and ethylcholesterol derivatives.

Quercetin and its 3-O-rhamnoside, kaempfero*l*-3-O-alpha-L-rhamnoside, amyrin, ceryl alcohol and beta-sitosterol have been isolated from leaves and stems.

Alcoholic extract of the bark is reported to be active against a wide range of bacteria. The aqueous extract has been found to enhance the life span of mice infected with Ehrlich ascites carcinoma by 24%.

Pure phenolic glucoside (P2), isolated from stem bark, exhibited highly potent oxytocic activity on different mammals and was similar in nature to pitocin and ergometrine.

Dosage ► Dried stem bark—20–30 g for decoction. (*API,* Vol. I.)

Sarcococca saligna (D. Don) Muell.-Arg.

Synonym ► *S. pruniformis* Hook. f. *S. trinervia* Wt.

Family ► *Buxaceae.*

Habitat ► The Himalayas and the hills of North-eastern India up to 2,700 m.

Folk ► Geru (Garhwal, Patiala), Tiliari (Jaunsar), Sukatsing (Kumaon).

Action ► Leaves—used in the treatment of rheumatism and fever.

The leaves contain steroidal alkaloids, including saracosine, saracodine and saracodinine; also betulin.

Aerial parts exhibit spasmolytic, diuretic and anti-inflammatory activity. Steroidal alkaloids induce non-recoverable fall in blood pressure in dogs.

Sarcostemma brevistigma W. & A.

Synonym ► *S. acidum* Voigt.

Family ► *Asclepiadaceae.*

Habitat ► Dry places in West Bengal, Bihar and Peninsular India.

English ► Moon Plant, Soma Plant.

Ayurvedic ► Somavalli, Somalataa, Somakshiri, Saumyaa, Dwijpriyaa. (Not to be confused with Soma of the Vedas.) (Substitute: *Ephedra gerardiana.*)

Siddha/Tamil ► Somamum, Kodi-Kalli.

Action ► Dried stems—emetic. Plant—insecticidal.

The plant contains malic acid, succinic acid, reducing sugar, surcosa, traces of tannin, an alkaloid, a phytosterol, alpha-and beta-amyrins, lupeol and lupeol acetate and beta-sitosterol. The milky exudate from the stem contains 4.1% of caoutchouc. Coagulum contains: caoutchouc 16, resins 68.1 and insolubles 15.9%.

Related species, *Sarcostemma brunonianum* W. & A. (South India), known as Perumaattaan kodi in Tamil Nadu; *S. intermedium* Decne (Peninsular India), and *S. stocksii* Hk. f. (Peninsular India), are also said to have similar uses as those of *S. acidum.*

Sarcostemma secamone (L.) Bennet, synonym *S. esculentum* (L. f.) Holm. (throughout the plains in semi marshy places) is known as Dughdhikaa or Duudhilataa in Northern India and Usippalai in Tamil Nadu. Whole plant is depurative, galactagogue and antiseptic (used as a gargle in sore throat and stomatitis; fresh root is prescribed in jaundice. A pregnane triglycoside, esculentin and cardenolide tetraglycosides have been isolated from the root.

Dosage ► Milky exudate from stem—1–3 drops. (*CCRAS.*)

Sarcostigma kleinii W. & A.

Family ► *Icacinaceae.*

Habitat ► The Western Ghats, from Konkan southwards.

Ayurvedic ► Ingudi. (*Balanites aegyptiaca* is also equated with Ingudi.)

Siddha ► Odal (Tamil).

Action ► Seed oil—used externally in rheumatism. Powdered bark—given in rheumatism, neurological disorders and skin diseases.

Sassafras albidum (Nutt.) Nees.

Synonym ► *S. officinale* Nees and Eberm.
S. variifolium Kuntze.

Family ► *Lauraceae.*

Habitat ► Canada to Florida. Dried roots of *S. albidum* are imported into India.

English ► Ague tree.

Unani ► Sassafras.

Action ► Root—used earlier for rheumatism, gout, kidney complaints and skin diseases.

Safrole is the main constituent of the volatile oil (80–90%), in addition to condensed tannins, resin, cinnamic acid derivatives. Safrole and its metabolite, L-hydroxysafrole are both neuro- and hepatotoxic (carcinogenic in animals). Its internal use is no more advised. Safrole-free extracts are ineffective.

Satureja hortensis Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to Mediterranean region; found in Kashmir.

English ► Summer Savory. Winter Savory is equated with *S. montana* L.

Action ► Flowering top—carminative, digestive, laxative, stomachic, diuretic, sudorific and vermifuge. Used in flatulent colic and menstrual suppression. A tea (of leaves) is given as a carminative and expectorant. Essential oil—antibacterial, antifungal, spasmolytic.

The plant gave fluorine, labiatic acid, ursolic acid and beta-sitosterol. Labiatic acid is antioxidant. The volatile oil consists mainly of carvacrol with *p*-cymene, beta-pinene, beta-phellandrene, limonene and borneol.

The volatile oil of *S. montana* contains carvacrol, *p*-cymene and thymol with alpha-and beta-pinene, cineole and borneol.

Sauropus androgynus Merrill.

Family ► *Euphorbiaceae.*

Habitat ► Sikkim, Khasi Hills and Western Ghats, and also grown in South India.

English ► Star Goose Berry.

Siddha/Tamil ► Thavasai Murungai.

Action ► Plant—known as Multivitamin Green for its substantial vitamin content. Decoction is given in stricture of the bladder and in fevers; used as a diuretic.

The leaves contain protein 6.8; carbohydrates 11.6; mineral matter 3.4, Ca 0.57, phosphorus 0.20, iron 28.0 mg, carotene (as vitamin A), 9,510 IU, thiamine 0.48, riboflavin 0.32, nicotinic acid 2.6, and vitamin C 247 mg/100 g.

Saussurea affinis Spreng. ex DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Foot Hills of Eastern Himalayas and in Aka and Laushai Hills.

Folk ► Ganga-muula (Assam).

Action ► Root—juice is prescribed in gynaecological diseases.

Saussurea gossypiphora D. Don.

Family ▶ *Compositae, Asteraceae.*

Habitat ▶ Himalayas from Garhwal to Sikkim at 4,200–5,100 m.

Folk ▶ Phen-kamal, Jogi Paashaa, Hiyun Kauni.

Action ▶ Plant, root—a decoction is prescribed in gynaecological diseases.

The plant afforded beta-sitosterol, 3-stigmastanol, stigmast-7-en-3-ol and ergostan-3,24-diol. The aerial parts of the plant collected from Himalayas gave heptacosane, hentriacontane, nonacosane, alpha- and beta-amyrins and their acetates and palmitates, lupeol, its acetate, fructose, glucose and surcose.

Saussurea heteromalla (D. Don) Raizada & Saxena.

Synonym ▶ *S. candicans* C. B. Clarke.
Carduus heteromallus D. Don.

Family ▶ *Compositae, Asteraceae.*

Folk ▶ Batula, Kaaliziri (Punjab).

Action ▶ Leaves—antiseptic; applied to wounds. Seeds—carminative. The plant exhibits CNS depressant and hypothermic properties.

Saussurea hieracioides Hook. f (Sikkim Himalayas at 3,600–4,200 m) gave a sesquilignan, saussol; scopoletin, luteolin-7-O-beta-D-glucoside and syringin were isolated from the aerial parts.

Saussurea hypoleuca spreng.

Synonym ▶ *S. auriculata* (DC.) Sch.-Bip.
Aplotaxis auriculata DC.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ The Himalayas from Kashmir to Sikkim.

Ayurvedic ▶ Kushtha (pseudo).

Folk ▶ Uplet (Maharashtra).

Action ▶ Leaves—used in the treatment of syphilis.

The root of the plant is found mixed with the root of Kushtha of Indian medicine.

Saussurea lappa (Decne) Sch.-Bip.

Synonym ▶ *S. costus* (Falc.) Lipsch.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Kashmir, Himachal Pradesh and Garhwal at 2500–3,000 m; cultivated in Kashmir and neighbouring regions.

English ▶ Kuth, Costus.

Ayurvedic ▶ Kushtha, Kusht, Vaapya, Kaashmira, Gada, Rug, Ruk, Aamaya, Paalaka. (Substitute: Pushkara Muula, *Inula racemosa.*)

Unani ▶ Qust.

Siddha/Tamil ▶ Kostum, Kottam.

Folk ▶ Sugandha-Kuutth.

Action ▶ Root—antispasmodic, expectorant, carminative, astringent, antiseptic. An ingredient of prescriptions for dyspepsia, asthma,

cough, chronic rheumatism, skin diseases. Applied locally to wounds and ulcerations. Powdered root, mixed with mustard oil, is applied to scalp in prurigo.

The Ayurvedic Pharmacopoeia of India recommends the root in cough, bronchitis, dyspnoea; erysipelas and gout.

The root (containing both the essential oil and alkaloid, saussurine) is used for asthma, particularly of vagotonic type. It produces a definite relaxtion of the bronchioles. The relief obtained is comparable to that of conventional bronchodilators without side effects, like a rise in blood pressure, sweating or headache even on repeated administration.

Saussurine depresses parasympathetic nervous system. The aminoacid-sesquiterpene adducts, saussureamines A, B and C show antiulcer effect. The aqueous extract of the root exhibits antianginal activity.

Essential oil inhibits peristalic movement of the gut. It is absorbed from the gastro-intestinal tract and partly excreted by lungs producing an expectorant action and partly by the kidneys producing diuretic effect. (In Western herbal, Kuth essential oil is not prescribed internally.)

Kuth roots contain resinoids (6%), and essential oil (1.5%), alkaloid (0.05%) inulin (18%), saussurea lactone (20–25%), a fixed oil and minor constituents like tannin and sugars. Roots obtained from Kashmir are, in general, richer in essential oil content than roots obtained from Garhwal and Nepal. The roots of Punjab variety gave costunolide, dehydrocostuslactone, costic acid, palmitic and linoleic acids, beta-sitosterol and alpha-cyclocostunolide. The Kashmir variety, in addition, gave alantolactone, beta-cyclocostunolide and *iso*-alantolactone.

The essential oil of the roots exhibit strong antiseptic and disinfectant activity against *Streptococcus* and *Staphylococcus.*

Costus speciosus Sm. synonym *Banksea speciosa,* also known as Kushtha, is a different herb of *Zingiberaceae* family. Rhizomes and stems yield diosgenin.

Dosage ► Root—0.2–1.0 g powder. (*API,* Vol. I.)

Saussurea obvallata Wall. ex C. B. Clarke.

Family ► *Compositae; Asteraceae.*

Habitat ► The Himalayas from Kashmir to Sikkim at 4,200–5,000 m.

Folk ► Brahma-kamal (Kumaon); Birm-kanwal (Punjab).

Action ► Roots—antiseptic, styptic, anti-inflammatory. Applied to wounds and cuts.

Plant—hypothermic. Flower—CNS active, antiviral. The flowers, after frying, are used in rheumatism.

Saussurea sacra Edgew.

Family ► *Compositae; Asteraceae.*

Habitat ► Near snow line at elevations of 4,000 m and above in the Himalayas.

English ► Yogiraj Plant, Sacred Saussurea.

Folk ► Jogi-paadshaah (Kashmir), Ghuggi (Garhwal).

Action ► Plant—used for nervous debility. Root—used for gynaecological disorders.

Scaevola frutescens
auct. non-Krause.

Synonym ► *S. koenigii* Vahl. *S. taccada* (Gaertn.) Roxb.

Family ► *Goodeniaceae.*

Habitat ► Sea coasts all around India and in the Andaman Islands.

English ► Fan Flower, Malay Rice Paper Plant.

Siddha/Tamil ► Vella-muttangam.

Folk ► Bhadraka, Bhadraaksha.

Action ► Leaves—digestive, carminative; applied externally on tumours and swollen legs. Fruit—juice, internally for inducing menstruation. Roots—used for dysentery.

A decoction of the leaves and the bark is reported to combat tachycardia, one of the principal symptoms of beriberi. The drug reduces the frequency of heartbeat, slows down pulse rate and at the same time stimulates the heart to normal contraction (does not possess cumulative action of digitalis). The drug acts as a diuretic by increasing the tension in the renal arteries without causing irritation of the kidney parenchyma; and is used for dropsy.

The aerial parts gave loganin, sylvestroside III, its dimethyl acetal, cantleyoside and its dimethyl acetal.

Schima wallichii
(DC.) Korth., Choicy.

Family ► *Theaceae.*

Habitat ► Eastern Himalayas from Nepal eastwards to Assam, Khasi Hills and Manipur up to 2,100 m.

English ► Chilauni Needle Wood.

Folk ► Chilauni. Makria (Assam).

Action ► Stem bark—anthelmintic (used for tapeworms), rubefacient. Aerial parts—antifungal.

The plant contains octacosanol, phytol, alpha-spinasterol and a saponin, schiwallin. Schiwallin is antidermatophytic.

The bark and leaves contain 6% and 4% tannin, respectively.

Schizachyrium exile Stapf.

Synonym ► *Andropogon exilis* Hochst.

Family ► *Gramineae; Poaceae.*

Habitat ► Bihar, Assam, Bengal and Tamil Nadu.

Ayurvedic ► Sprkaa, Sprk.

Action ► Used as a substitute for *Delphinium Zalil.*

Schleichera oleosa (Lour.) Oken.

Synonym ► *S. trijuga* Willd & Klein.

Family ► *Sapindaceae.*

Habitat ► The sub-Himalayan tract from Kashmir to West Bengal; Bihar, Punjab, Madhya Pradesh, southwards to Peninsular India.

English ► Lac tree, Macassar Oil tree, Honey tree, Ceylon Oak.

Ayurvedic ► Koshaamra, Kshudraamra, Lakshaa vrksha, Ghanaskandha.

Siddha/Tamil ► Puvathipuvam, Pulaachi.

Action ► Bark—astringent; mixed with oil, applied externally in skin eruptions. Seed oil—used for massage in rheumatism and applied in alopecia, itch and acne; stimulates hair growth. (Tree is an important host of Kusmi lac.)

Fatty acids of the oil consisted of oleic (52.%), gadoleic, stearic, arachidic, behenic, palmitoleic and palmitic acids. Young leaves contain gallo-tannic acid (5.09%, dry matter basis). The bark contains 9.4% tannin.

Dosage ► Bark—50–100 ml decoction. (*CCRAS.*)

Schrebera swientenioides Roxb.

Family ► *Oleaceae.*

Habitat ► Tropical and subtropical Himalayas from Kumaon eastwards; also Bihar, West Bengal and Peninsular India, up to 1,200 m.

English ► Weaver's Beam tree.

Ayurvedic ► Muskakaa. (Mokshaka, Ghantaa-Paatali, Kaashthapaatalaa are varieties of Paatalaa.)

Siddha/Tamil ► Mogalingum.

Action ► Leaves—used in enlargement of spleen and in urinary discharges. Root—used for leprosy. Bark—used for boils and burns. Fruits—beneficial in hydrocele.

The Fruits gave betulinic and oleanolic acids.

Schweinfurthia sphaerocarpa A. Br.

Synonym ► *S. papilionacea* (Burm. f.) Boiss.

Family ► *Scrophulariaceae.*

Habitat ► The arid regions of Gujarat and in Rajasthan.

Ayurvedic ► Nepaal-Nimba.

Folk ► Saannipaat (Maharashtra).

Action ► Broken pieces of dried fruits, stems and leaves—used in enteric fever. Leaf—antidiabetic. Fruit, leaf, stem—diuretic.

An alkaloid, schweinfurthin, a hydrocarbon and an unsaturated ketone were reported from the leaves. Recently, two macrocylic alkaloids, 11-*epi*-ephedradine and schweinine, have been isolated from the whole plant, along with (−)-ephedradine A. Experimentally, 11-*epi*-ephedradine A was mutagenic to *Salmonella typhimurium.*

S

Scilla indica Baker non-Roxb.

Synonym ► S. hyacinthiana (Roth) Macb.
Ledebouria hyacinthina Roth.

Family ► *Liliaceae.*

Habitat ► Central and Southern India, including Deccan Peninsula.

English ► South Indian Squill. Substitute for White Squill, *Urginea maritima* Baker and Indian Squill, *Urginea indica* Kunth.

Ayurvedic ► Vana-Palaandu (South India), Korikanda.

Unani ► Jangli Piyaz.

Siddha/Tamil ► Kattu velvengayam.

Action ► Bulb—cardiotonic, stimulant, expectorant, diuretic. Used in cough, dysuria, strangury. (Not used as a diuretic when kidneys are inflamed.)

The bulb contains cardioactive glycosides including bufadienolides, scillaren A, scillaridin A and proscillaridin A.

The squill has shown to have cardiac effects similar to digoxin, including positive inotropic and negative chronotropic effects. The aglycones in squill are poorly absorbed from the GI tract and are therefore less potent than digitalis cardiac glycosides. Additional cardiovascular properties include reducing left ventricular diastolic pressure and reducing pathologically elevated venous pressure. (*Natural Medicines Comprehensive Database,* 2007.)

Large amounts of squill are gastric irritants; small amounts expectorant.

The squill of the Indian bazaars consists partly of *S. indica* and chiefly of *Urginea indica.*

Scindapsus officinalis Schott.

Family ► *Araceae.*

Habitat ► Tropical Himalayas, Bengal, southwards to Andhra Pradesh and the Andamans.

Ayurvedic ► Gajakrishna, Hastipippali, Gajapippali (also equated with *Piper chaba*).

Siddha/Tamil ► Anaitippili.

Action ► Fruits—stimulant, carminative, diaphoretic, anthelmintic, antidiarrhoeal. Decoction is used as an expectorant in asthma. Fruits and shoots—hypoglycaemic. Fruit pulp—applied externally in rheumatism.

The Ayurvedic Pharmacopoeia of India recommends dried pieces of mature female spadix in dyspnoea. (Gajapippali is wrongly equated with male or female inflorescence of *Borassus flabellifer* Linn.)

The fruits contain two glycosidic substances—scindapsin A and B, which on hydrolysis yield the aglucons, scindapsinidine A and B. Free sugars, rhamnose, fructose, glucose and xylose together with some di-and trisaccharides have been identified in the plant.

Dosage ► Dried pieces of mature female spadix—2–3 g for infusion. (*API,* Vol. II.)

Scirpus articulatus Linn.

Family ► *Cyperaceae.*

Habitat ► Grown in aquatic gardens.

Ayurvedic ► Laghu Kasheruka.

Folk ► Chichodaa.

Action ► Tubers—prescribed in diarrhoea and vomiting.

See *S. kysoor.*

Scirpus corymbosus Roth.

Family ► *Cyperaceae.*

Habitat ► Throughout India, in shallow waters.

Ayurvedic ► Kronchaadana.

Action ► Tuber—prescribed for diarrhoea, dysentery and emesis.

Scirpus kysoor Roxb.

Synonym ► *S. grossus* Linn. f.

Family ► *Cyperaceae.*

Habitat ► Distributed throughout India, especially in swamps, up to an altitude of 700 m.

Ayurvedic ► Kasheru, Kasheruka.

Siddha/Tamil ► Karundan, Gundatigagaddi (rhizome).

Folk ► Kaseru.

Action ► Tuber—nutritious, astringent, antidiarrhoeal, antiemetic, galactagogue, hypoglycaemic, diuretic, urinary antiseptic. Used in prescriptions for dysuria, diabetes, genitourinary affections, dyscrasia and as a spermopoietic and liver tonic.

The Ayurvedic Pharmacopoeia of India recommends the powder of the rhizome for promoting spermatogensis and development of breast.

The tuber gave progesterone, sugars, tannins, starch and saponins. The fruit contains amylase.

The tuber of *Scirpus lacustris* L. (Kashmir, Ladakh, Kumaon), known as Great Bulrush or Clubrush, is also used as astringent, diuretic and antimicrobial. The aromatic compounds isolated from the rhizomes include derivatives of benzaldehyde, hydroxybenzoic and cinnamic acids.

Dosage ► Rhizome—5–10 g powder. (*API,* Vol. I.)

Scirpus tuberosus Desf.

Synonym ► *S. maritimus* C. B. Clarke non Linn.

Family ► *Cyperaceae.*

Habitat ► Marshy areas and on the banks of streams up to an altitude of 3,000 m.

English ► Sea Clubrush.

Ayurvedic ► Raaj Kasheruka.

Action ► Tuberous root—astringent, diuretic, laxative.

Oil from rhizomes on hydrolysis gave phellonic acid.

Scleria lithosperma Sw.

Family ► *Cyperaceae.*

Habitat ► Throughout India, up to an altitude of 900 m, except in acrid areas in the West.

English ► Scleria.

Action ► Plant—antinephritic. Root—decoction is given after parturition. Young tops—given to children for enlarged stomach.

The roots of *Scleria biflora* Roxb. smell strongly of camphor or cajeput.

The fruits of *S. levis* are used for cough and stomach disorders.

A decoction of the sedge of *S. pergracilis* (Nees) Kunth (the Himalayas from Garhwal to Assam at altitudes of 1,500 m and in Bihar, West Bengal and Deccan Penninsula) is used for cough.

(Folk names not known. About 28 species are found in India.)

Scoparia dulcis Linn.

Family ► *Scrophulariaceae.*

Habitat ► Indigenous to tropical America; introduced into India, commonly found as a weed in Bengal and Tamil Nadu, and in many parts of India.

English ► Sweet Broomweed.

Folk ► Jastimadhu, Madhukam, Ghodaa-tulasi.

Action ► Plant—decoction is used for gravel and other renal affections. Leaves—infusion used in fever, cough and bronchitis. Root—febrifuge. Stem and leaves—used in anemia, albuminaria, ketonuria and other complications associated with diabetes mellitus.

An antidiabetic compound, amellin, occurs in the leaves and stems of the green plant.

According to some researchers, hypoglycaemic compounds were not present in the extracts obtained from dry plant material.

The leaves contain the flavonoids, scutellarein and 7-O-methylscutella rein. Whole plant gave the triterpenoids, dulcitol, friedelin, scopadol, betulinic acid, dulcitolic acid and dulciolone. Benzoxazolinone, beta-sitosterol, D-mannitol, hexacosanol and tritriacontane were also obtained from the plant.

Scopolia anomala Airy Shaw.

Synonym ► *S. lurida* Dunal.

Family ► *Solanaceae.*

Habitat ► The Himalayas from Kumaon to Sikkim, up to 3,900 m.

English ► Scopolia.

Action ► Used like belladonna.

Dried leaves contain 0.32% of alkaloids comprising hyoscyamine, himaline, atropine and scopolamine.

Ripe seeds contain a small amount of atropine but no hyoscyamine. Extracts of leaves, stalks and seeds showed presence of atropine, scopolamine, cuscohygrine, hellaradine, tropine, scopine. The alkaloid himaline exhibits atropine type activity. Roots (total alkaloid content 1.9–2.8%), in addition, contain hyoscyamine and himaline. The alkaloid content of the root is reported to be 4.64 times more than that of the leaves of *Atropa belladonna.*

Flavonoids occurring in the leaves and roots are chlorogenic acid, scopoletin, and scopoline; the leaves, in addition, contain rutin and caffeic acid.

A related species, *S. carniolica* Jacquin, (rhizome), has been approved by *German Commission E,* for use in spasm of gastrointestinal tract, bile ducts and urinary tract.

The rhizome of *S. carniolica* (Central and Eastern Europe) gave tropane alkaloids, including hyoscine and hyoscyamine with cuscohygrine, tropine and pseudotropine.

Leaf extract of Indian species (*S. anomala*) is found to be more active than belladonna infusions.

Scutellaria galericulata Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Kashmir at 1,500–2,400 m.

English ► Skullcap (equated with *S. lateriflora* Linn.), Scurvy Grass.

Action ► Central nervous relaxant and restorative, brain and CNS vasodilator, sedative, antispasmodic, anticonvulsive. Used for nervous stress, disturbed sleep, menstrual tension, headache, migraine, neurological and neurimotor conditions, epilepsy.

Roots, stem and flowers of *S. galericulata* gave flavonoids and their glycosides, chrysin-7-glucuronide, baicalein, baicalin, apigenin, apigenin-7-glucoside and galeroside (baicalcin-7-beta-L-rhamnofuranoside). Cytotoxicity of baicalin and baicalein (isolated from *S. barbata* D. Don synonym *S. rivularis* Wall.) has been investigated on human hepatoma cell lines, human liver cells and human pancreatic cancer line. (*Chem Abstr,* 121, 292196y, 1994.)

S. galericulata is used as an adulterant of *S. lateriflora.* (See also *WHO* monograph on *Scutellaria grandiflora* Adams.)

In Oriental medicine, Skullcap refers to *S. baicalensis* Georgi. It contains the flavonoids baicalin, baicalein, wogonin, skullcapflavones I and II in addition to other flavones. Baicalin exhibits anti-inflammatory and antiallergic properties.

S. baicalensis inhibited lipid peroxidation in rat liver and has been clinically tested in China; patients with chronic hepatitis showed improvement (above 70%) in various symptoms. (*Potter's New Cyclopedia.*)

According to *The British Herbal Pharmacopoeia, S. lateriflora* can be used as a mild sedative.

Scutia myrtina Kurz.

Synonym ► *S. indica* Brongn.

Family ► *Rhamnaceae.*

Habitat ► The Deccan peninsula from Mahabaleshwar southwards, and Orissa.

Folk ► Cheemaat (Gujarat, Maharashtra); Tuvadi (Tamil Nadu); Gariki (Andhra Pradesh).

Action ► Fruit—astringent. Leaf—used in an ointment applied locally to hasten parturition.

Sebastiana chamaelea Muell.-Arg.

Family ► *Euphorbiaceae.*

Habitat ► Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal, Orissa and South India.

Folk ► Bhui-erendi.

Action ► Plant—astringent, antidiarrhoeal. A decoction of the plant, mixed with purified butter, is applied to the head in vertigo.

Secale cereale Linn.

Family ► *Poaceae.*

Habitat ► Ladakh, Lahul and other north-western Himalayan areas; and as host for cultivation of medicinal ergot (fungus) in Kashmir.

English ► Rye Grass.

Action ► Grass—used for benign prostatic hyperplasia (BPH), chronic prostatis and prostatodynia.

S

Rye bread, biscuits, porridge and alcoholic products are available in European countries and the US. Rye grain contains 12.1% protein; made up of 42% gliadin (a prolamine), 42% glutelin, 8% globulin and 8% albumin. The biological value of Rye protein at 5% level of intake is 80.4% and the coefficient of true digestibility 91.0%.

The mineral contents in the grain are: calcium 61, potassium 453, magnesium 155, phosphorus 376, sulphur 146 and iron 4.8 mg/100 g; and small amounts of zinc, copper, manganese and aluminium. The carbohydrates (73.4%) include surcose, pentosans, starch and raffinose.

Medicinally applicable part of Rye Grass is the polan extract. The extract contains beta-sitosterol; relaxes urethral smooth muscle tone and increases bladder muscle contraction. Some evidence suggests that it might affect alpha-adrenergic receptors and relax the internal and external bladder sphincter muscle. The extract does not affect LH, FSH, testosterone or dihydrotestosterone. A specific Rye Grass pollen extract 126 mg three times daily has been used for BHP. (*Natural Medicines Comprehensive Database,* 2007.)

(It is not known if Rye Grass pollen is comparable to finasteride or hytrin. However, it is comparable to Pygeum and Paraprost, a Japanese prostate remedy containing L-glutamic acid, L-alanine and aminoacetic acid.)

Securinega suffruticosa (Pall.) Rehder.

Synonym ► *S. ramiflora* Muell. *Flueggea suffruticosa* Baill.

Family ► *Euphorbiaceae.*

Habitat ► Eastern Himalayas, up to an altitude of 250 m.

Siddha/Tamil ► Vellaippula (*S. virosa*).

Folk ► Dalme, Kodarsi, Pandharphali (*S. virosa*).

Action ► Alkaloid, securinine in the leaves stimulates central nervous system similar to strychnine and

is comparatively less toxic. It is found useful in paresis and paralysis following infectious diseases and physical disorders. (The plant can replace strychnine and nux-vomica in medicinal preparations.)

A related species, *Securinega virosa* (Roxb. ex Willd.) Baillon, distributed throughout India up to an altitude of 2,000 m, gave securinine as the main alkaloid, along with virosecurinine and viroallosecurinine, and a coumarin, bergenin. The root bark contains an alkaloid, virosine. Whole root contains alkaloids, hordenine (flueggeine) and nor-securinine. A decoction of the root is given to induce sleep and for fever; that of bark in diarrhoea and pneumonia. The leaves are reported to be given in venereal diseases.

Selaginella involvens Spring.

Family ► *Selaginellaceae.*

Habitat ► Hilly regions of India at altitudes of 1,000–2,000 m.

Ayurvedic ► Kara-jodi-kanda (related species).

Folk ► Hatthaa jodi (related species).

Action ► Used as an age-sustaining tonic. The original source is *S. rupestris* Spring.

Selaginella rupestris Spring.

Family ► *Selaginellaceae.*

Habitat ► Indian gardens, as ornaments.

English ► Little Clubmoss.

Ayurvedic ► Kara-jodi-Kanda.

Folk ► Hatthaajodi.

Action ► Plant—a decoction is prescribed as a tonic and protective medicine after child birth; also as a sedative.

S. tamariscina Spring var. *pulvinata* (Kumaon to Assam), known as Hatthaajodi, is used as an age-sustaining tonic and has been credited with the property of prolonging life. A decoction is prescribed for amenorrhoea, bleeding piles and prolapse of rectum.

A decoction of *S. wallichii* Spring (hilly regions of north-eastern India), known as Hatthaajodi, is prescribed after childbirth. *S. willdenovii* Baker (Nicobar Islands) is also known as Hatthaajodi. Its infusion is administered in cases of high fever and ashes are used in a liniment for backache.

Selenicereus grandiflorus Britton & Rose.

Synonym ► *Cereus grandiflorus* Mill.

Family ► *Cactaceae.*

Habitat ► Indigenous to Mexico; introduced in Indian gardens.

English ► Night-Blooming Cereus, Sweet-scented Cactus.

Ayurvedic ► Visarpin, Mahaapushpa, Raatripraphulla.

Action ► Flowers and tender shoots—cardiac stimulant and diuretic (used for irritable bladder and congested kidneys), central nervous system stimulant.

The plant contains alkaloids (including cactine) and flavonoids based on isorhamnetin.

Alkaloid, cactine is reported to have a digitalis-like activity on the heart. (Alcoholic extract is used in homoeopathy.)

Selinum monnieri Linn.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► East Bengal, Bhutan and Assam.

Folk ► Muraa (var.).

Action ► Fruits—extracts used for osteoporosis, gynaecological problems and stress-related disorders. Seeds—prescribed in rheumatism and renal diseases.

In Japan, the plant is mainly used for the treatment of swelling of women's genitals.

The aerial parts contain the chromones, cnidimol and karenin. The fruits contain the benzofurans, cnidioside A, B and C, cnidiol b and C; besides furanocoumarins, imperatorin, bergapten, xanthotoxin, osthol and several terpenoids. The seeds and volatile oil from the fruits also contain osthol and other coumarins.

The coumarins prevented glucocorticoid-induced osteoporosis in rats; they also reversed bone loss at early menopausal stage. Osthol showed antiallergic activity. Cnidioside A and B and cnidiol b alleviate physiological disorders caused by physical and mental stress; enhancement of sexual activity has also been observed.

Selinum tenuifolium Wall. ex DC.

Synonym ► *S. candollei* DC.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► The Himalayas from Kashmir to Nepal at altitudes of 1,800–4,200 m.

Ayurvedic ► Muraa, Surabhi, Daitya, Gandhakuti, Gandhavati. (Substitute for *Nardostachys jatamansi.*)

Siddha/Tamil ► Mural.

Folk ► Bhuutakeshi (Kashmir), Muur (Garhwal).

Action ► Roots—sedative, analgesic.

Isoimperatorin and oxypeucedanin have been isolated as major inotropic constituents from the rhizomes.

The Ayurvedic Pharmacopoeia of India recommends the root in syncope, giddiness, also for asthma.

Dosage ► Root—1–3 g powder. (*API,* Vol. II.)

Selinum vaginatum C. B. Clarke.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► North-Western Himalayas from Kashmir to Kumaon at altitudes of 1,800–3,900 m.

Ayurvedic ► Rochanaa-Tagara.

Folk ► Peshaavari-Bhuutakeshi (Kashmir), Taggar (Garhwal).

Action ► Roots—used as a nervine sedative. Oil—sedative, analgesic, hypotensive.

S

The roots gave coumarins, angelicin, oroselol, lomatin, selinidin, vaginidin, vaginol; a flavone derivative selinone; a sesquiterpene vaginatin.

The dry roots yield an essential oil containing alpha-pinene 45.5 limonene 25.3, camphene 5.7, beta-phellandrene 5.2, alpha-thujene 1.2, fenchyl alcohol 3.2, terpineol 3.8, and a ketone 2.6%. Beta-pinene and fenchone have also been reported.

The roots are sold in the drug markets of Jammu mixed with those of *Seseli sibiricum.* The roots are also used as a substitute for *Nardostachys jatamansi.*

Semecarpus anacardium Linn. f.

Family ▶ *Anacardiaceae.*

Habitat ▶ Punjab, Assam, Khasi Hills, Madhya Pradesh and Peninsular India.

English ▶ Marking-Nut.

Ayurvedic ▶ Bhallaataka, Bhallata, Arushkara, Agnik, Agnimukha, Sophkrit, Viravrksha.

Unani ▶ Balaadur, Bhilaayan, Bhilaavaan.

Siddha/Tamil ▶ Shenkottei, Erimugi. (Kattu shen-kottai is equated with S. travancorica Bedd., found in evergreen forests of Tinnevelly and Travancore.)

Folk ▶ Bhilaavaa.

Action ▶ Toxic drug, used only after curing. Fruit—caustic, astringent, anti-inflammatory, antitumour. Used in rheumatoid arthritis and for the treatment of tumours and malignant growths.

A decoction, mixed with milk or butter fat, is prescribed in asthma, neuralgia, sciatica, gout, hemiplegia, epilepsy. Kernel oil—antiseptic; used externally in gout, leucoderma, psoriasis and leprosy. Bark gum—used for nervous debility; in leprous, scrofulous and venereal affections.

Bigger var. is equated with *S. kurzii* Engler.

The nut shells contain biflavonoids, including tetrahydrobustaflavone, tetrahydroamentoflavone and anacarduflavanone; nallaflavone; anacardic acid; aromatic amines and bhilawanol. Bhilawanol is a mixture of phenolic compounds, including *cis* and *trans* isomers of urushenol (3-pentadecenyl-8′ catechol), monohydroxy phenol and semicarpol. These are the major constituents of the shell liquid, isolated from the nuts (about 46% of the weight of extract).

A mixture of closely related pentadecyl catechols exhibits anticancer activity. Extracts of the fruit was found effective against human epidermoid carcinoma of the naso-pharynx in tissue culture.

Milk extract of the nut showed anti-inflammatory activity against carrageenin, 5-HT and formaldehyde-induced rat paw oedema in acute anti-inflammatory studies. (About 20% animals developed gangrene of limbs, tail and ears.)

Dosage ▶ Detoxified fruit—1–2 g in milk confection. (*API,* Vol. II.)

S

Sempervivum tectorum Linn.

Family ► *Crassulaceae.*

Habitat ► Nilgiris, as ornament. (A common garden plant in Britain and Europe.)

English ► Houseleek.

Action ► Leaves—refrigerant, astringent, antispasmodic; applied as poultice to inflammatory conditions of skin. Juice of the leaves is applied topically for treating corns.

The leaves sliced in two and the inner surface applied to warts, act as a positive cure for corns.

The leaves contain tannin, malic acid and mucilage. Three related species are found in the alpine Himalayan range from Kumaon to Kashmir.

Senecio jacquemontianus Benth.

Family ► *Compositae; Asteraceae.*

Habitat ► The Western Himalayas and Kashmir at elevation of 3,000–3,900 m.

Folk ► Poshkar, Hatermuula (Kashmir).

Action ► Root—nervine tonic. Used as an adulterant of Saussurea lappa.

Whole plant extract gave senecionine.

Senecio vulgaris Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► The Nilgiris and Uttar Pradesh. Introduced into Indian gardens

English ► Groundsel.

Action ► Formerly used as a diuretic, diaphoretic and emmenagogue, in dysmenorrhoea and bilious pains. No more recommended for internal use due to high concentration of hepatotoxic alkaloids. Infusion is used as a lotion in chronic mastitis, gout and haemorrhoids. Extracts of the plant are haemostatic.

From the dried plant material alkaloids (0.053–00.095%) have been isolated, including, seneciphylline, senecionine and retrorsine. Senecionine and retrorsine have been demonstrated to induce hepatic necrosis in experimental animals. The plant contains 950 mcg/kg of iodine on fresh basis.

A related species used in Western herbal, *Senecio aureus* Linn. (Golden Groundsel, Squaw Weed) is a uterine relaxant, stimulant to gravid uterus and a soothing drug for nervous and vascular irritability, menopausal symptoms, hot flushes. Alkaloids include senecifoline, senescine, senecionine and otosenine—pyrrolizidine alkaloids, in isolation, are highly toxic to liver. The plant is recommended only for external use as a douche for excessive vaginal discharge.

Seronoa repens (Bartram) Small.

Synonym ► *Sabal serrulata* (Michaux) Nichols.

Family ► *Palmae.*

Habitat ► Southeastern North America.

English ► Sabal, Saw Palmetto.

Action ► Ripe fruit—diuretic, urinary antiseptic, antiandrogenic, and antiexudative.

The fruit contains fatty acids, especially capric, caproic, caprylic, lauric, myristic, oleic, linoleic, linolenic, stearic and palmitic acids; sterols, principally beta-sitosterol and its 3-glucoside (and fatty acid derivatives), campesterol and stigmasterol; triglycerides; triterpenes; alkanols; polysaccharides; flavonoids; essential oil and anthranilic acid.

Key application ► In urination problems due to benign prostatic hyperplasia stages I and II (*German Commission E, ESCOP, WHO.*) (The lipophilic extracts of Saw Palmetto berries are used in France and Germany for the treatment of BPH. In a study (1999), shrinkage of the epithelial tissue in the transition zone of the prostate has been recorded. (*Expanded Commission E Monographs.*) (For Clinical studies, see *ESCOP.*)

In India, *Sabal palmetto* Lodd. Ex Roem. & Schult (Sabal or Cabbage Palm) is planted in gardens for ornament. The sweet drupes are eaten as such or cooked for preparing a syrup. Other species of Sabal introduced into Indian gardens are: *S. mauritiiformis* Griseb. & Wendl., *S. mexicana* Mart., *S. umbraculifera* Mart., and *S. minor* Pers. The leaves of *S. mexicana* contain cyanidin. The leaves of S. minor contain caffeic, *p*-coumaric and sinapic acids.

Sesamum indicum Linn.

Synonym ► *S. orientale* Linn.

Family ► *Pedaliaceae.*

Habitat ► Uttar Pradesh, Madhya Pradesh, Rajasthan, Orissa, Gujarat, Andhra Pradesh, Tamil Nadu, and Maharashtra.

English ► Sesame, Gingelly.

Ayurvedic ► Tila, Snehphala.

Unani ► Kunjad, Til.

Siddha ► Ellu (seed), Nallennai (oil).

Action ► Seeds—an important source of protein; also rich in thiamine and niacine. Nourishing, lactagogue, diuretic, laxative, emollient. Powdered seeds—given internally in amenorrhoea and dysmenorrhoea. (Black seeds are preferred in Indian medicine.) Paste is applied to burns, scalds, piles. Leaves—used in affections of kidney and bladder. Bland mucilage is used in infantile diarrhoea, dysentery, catarrh and bladder troubles, acute cystitis and strangury.

Non-saponifiable fraction of the seed oil gave sterols, a lignans, sesamin and a nitrolactone, sesamolin. Sesamin and sesamolin are not found in any other vegetable oil. Sesamin is present in a concentration of 0.5 to 1.0%. The oil from the white seeds from West Bengal and Assam is reported to contain about 2.5% sesamin. Sesamol, a phenolic antioxidant, is present in traces.

The leaves gave a flavonoid, pedalin. Pinoresinol has also been reported from the plant.

The seed contains thiamine, niacin, riboflavin, nicotinic acid, pantothenic acid, folic acid, biotin, pyridoxine, inositol, choline, *p*-aminobenzoic acid, ascorbic acid, vitamin A, alpha-and beta-tocopherol. Sugars present are glucose, surcose, galactose, planteose, raffinose. Fatty acid in the seed are myristic, palmitic, stearic, arachidic, hexadecenoic, oleic, linoleic and lignoceric.

Basic aroma compounds of the roasted seeds consisted of mainly dimethyl thiazole and substituted pyrozines.

Dosage ▶ Seed—5–10 g powder. (*API,* Vol. IV.)

Sesbania bispinosa W. f. Wight.

Synonym ▶ *S. aculeata* (Willd.) Poir.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Western Himalayas and plains, southwards to Peninsular India.

English ▶ Prickly Sesban, Dhaincha.

Ayurvedic ▶ Jayanti (var.), Itkata (var.).

Siddha/Tamil ▶ Mudchembai.

Action ▶ Seeds—used externally in ringworm and skin diseases. Plant—used for treating wounds.

The leaf, stem and fruit gave positive test for alkaloids. A mixture of saponins, reported to be present in the seeds, yields on hydrolysis oleanolic acid and neutral sapogenin. Colloidal substances similar to those of marine algae, locust bean gum, guar gum and gum tragacanth are reported in the seeds.

Sesbania grandiflora (L.) Poir.

Synonym ▶ *Agati grandiflora* Desv.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ Native to tropical Asia; grown in Assam, Bengal, Punjab, Vadodara, Andhra Pradesh and Tamil Nadu.

English ▶ Agati Sesban, Swamp Pea.

Ayurvedic ▶ Agastya, Agasti, Munidrum, Munitaru, Muni, Vangasena, Vakrapushpa, Kumbha.

Siddha/Tamil ▶ Agatti.

Action ▶ Plant—astringent, antihistaminic, febrifuge. Used for intermittent fevers, catarrh, cough, consumption, glandular enlargement.

The aqueous extract of flowers has been found to produce haemolysis of human and sheet erythrocytes even at low concentration due to methyl ester of oleanolic acid. Flowers also gave nonacosan-6-one and kaempferol-3-rutinoside.

The seed gave kaempferol-3,7-diglucoside, (+)-leucocyanidin and cyanidin-3-glucoside. Seed also contains galactomannan.

A saponin present in the leaves on hydrolysis gave an acid sapogenin oleanoic acid, galactose, rhamnose and glucuronic acid. Besides saponin, the leaves contain an aliphatic alcohol, grandiflorol.

The bark contains gum and tannin. The red gum is used as a substitute for Gum arabic. An infusion of the bark is given in first stages of smallpox and other eruptive fevers (emetic in large doses).

Dosage ► Whole plant—10–20 ml juice; 50–100 ml decoction. (*CCRAS.*)

Sesbania sesban (Linn.) Merrill.

Synonym ► *S. aegyptiaca* Pers.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Cultivated and wild throughout India.

English ► Common Sesban.

Ayurvedic ► Jayantikaa, Jayanti, Jayaa, Jwaalaamukhi, Suukshma-muulaa, Suukshma-patraa, Keshruuhaa, Balaamotaa.

Siddha/Tamil ► Sembai, Karum-sembai (leaf).

Folk ► Jainta.

Action ► Seed and bark—astringent, emmenagogue. Used in menorrhagia, spleen enlargement and diarrhoea. Leaves—anti-inflammatory. Bark—juice applied to cutaneous eruptions. Unsaponifiable matter of fixed oil from seeds—cardiac depressant, antibacterial.

The Ayurvedic Pharmacopoeia of India recommends the use of the leaf in dysuria.

The pods and leaves contain cholesterol, campesterol and beta-sitosterol. Flowers contain cyanidin and delphinidin glucosides. Pollen and pollen tubes contain alpha-ketoglutaric, oxaloacetic and pyruvic acids.

Dosage ► Leaf—3–6 g powder. (*API,* Vol. II.)

Seseli indicum W. & A.

Synonym ► *S. diffusum* (Roxb. ex Sm.) Santapau & Wagh

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Outer hills of the Himalayas in Kumaon and in the plains from Punjab to Bengal, and in Tamil Nadu and Mysore.

Ayurvedic ► Vanya-yamaani.

Action ► Seeds—stimulant, anthelmintic (used for round worms), carminative.

Seselin, isolated from the seeds, exhibited significant and dose-dependent anti-inflammatory activity in carrageenan-induced acute inflammation in rats. It also exhibited significant analgesic activity and was found to be safe in oral doses up to 6 g/kg (body weight) in 72 h mortality test in mice.

A sample of commercial oil, available as Ajmod Oil, is reported to contain (+)-limonene (50%), seselin, (−)-beta-selinene and beta-cyclolavendulic acid.

Seseli sibiricum Benth. ex C. B. Clarke

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Jammu and Kashmir at altitudes of 2,500 to 3,500 m.

Ayurvedic ► Bhuutakeshi. *Selinum* sp. are also known as Bhuutakeshi.

Action ► Used for mental disorders as a tranquilizer. Volatile oil—hypotensive.

The volatile oil, distilled from the root, contains alpha-and beta-pinene, myrcene, limonene, *p*-cymene, beta-phellandrene (major constituent), fenchone, fenchyl alcohol and acetate, fenchyl hydroxy cinnamate, osthol, *p*-hydroxy cinnamate (0.1%), sesibricin, imperatorin and bergapten.

The volatile oil from aerial parts causes a fall in blood pressure, vasoconstriction and stimulation of respiration. The action appears to be tranquillizing. It potentiates the effects of pentobarbital in rats and has no anticonvulsant activity. Smooth muscle activity is inhibited by the oil and negative inotropic and chronotropic effects are observed on heart muscle.

Setaria italica (Linn.) Beauv.

S

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated in Andhra Pradesh, Tamil Nadu, Gujarat, Maharashtra and Karnataka.

English ► Italian Millet, Fox-tail Millet.

Ayurvedic ► Kangu, Kanguni, Kangunikaa, Priyangu Dhaanya (Millet). (Priyangu, aromatic flower buds or seed kernels, is a different drug. *Callicarpa macrophylla* and *Prunus mahaleb* are equated with Priyangu.)

Siddha/Tamil ► Tenai.

Action ► Plant—used as a sedative to the gravid uterus. Grain—used for alleviating pain after parturition. Applied externally in rheumatism.

(The grain is reported injurious to horses. Overfeeding affects kidneys and causes swelling and inflammation of joints.)

Analysis of a dehusked sample (79% of whole grain) gave following values: protein 12.3, fat 4.3, minerals 3.3, crude fibre 8.0, and other carbohydrates 60.9%. The principal protein of the millet is prolamin (48%), albumin and globulin together form 13–14% of the total protein, and glutelin 37%. The oxidation of unsaturated fatty acids, present in the grain, during the cold winter months is reported to yield toxic substances.

Shorea robusta Gaertn. f.

Family ► *Dipterocarpaceae.*

Habitat ► North, east and central India.

English ► Sal tree. Oleoresin: Sal Dammer or Bengal Dammer.

Ayurvedic ► Shaala, Saalasaara, Dhuupa-vriksha. (Substitute: *Vateria indica.*)

Siddha/Tamil ► Kungiliyam, Venkungiliyam (resin).

Action ► Fruit—a paste is prescribed in diarrhoea. Resin—astringent, detergent; antidiarrhoeal and antidysenteric. Essential oil of Sal resin—antiseptic. Used for skin diseases.

The bark contains 7–12, young leaves 20, twigs and leaves 22, and powder dust 12% tannin. The spray-dried aqueous extract of the bark contains 39.6% of tannins with a trans/non-trans ratio of 0.73. The tannins are of pyrogallol type. Oleanolic acid has also been isolated from the bark.

Several triterpenoids have been isolated from the resin. Hydroxy-hopanone, dammarenediol II (20S) and dammarenolic acid are reported to exhibit antiviral activity against *Herpes simplex.* The resin on dry distillation yields an essential oil, known as Chuaa Oil. It consists of 96.0% neutral and 3.0 and 1.9% phenolic and acidic fractions respectively. Non-phenolic portion of the oil is reported to have a depressing effect on the central nervous system, the phenolic portion is less effective.

Dosage ► Heartwood, flower—3–5 g powder; 50–100 ml decoction; resin—1–3 g. (*CCRAS.*)

Sibbaldia parviflora Willd.

Family ► *Rosaceae.*

Habitat ► Garwal region.

Ayurvedic ► Bajradanti. *Barleria prionitis* L. and *Potentilla arbuscula* D. Don. are also used as Bajradanti.)

Action ► Used as a tooth powder for strengthening gums and teeth.

Sida acuta Burm. f.

Synonym ► *S. carpinifolia* auct. non Linn f.

Family ► *Malvaceae.*

Habitat ► Throughout the warmer parts of India.

English ► Hornbeam-Leaved Sida.

Ayurvedic ► Balaa (white-flowered var.).

Folk ► Jangali Methi.

Action ► Root—astringent, cooling, stomachic, febrifuge, diuretic; used for nervous and sexual debility, haemorrhoids, biliary disorders. Leaves—demulcent; applied to testicular swellings and elephantiasis.

The root contains alkaloids—phenethylamine, ephedrine (major), si-ephedrine, vasicinol, vasicinone, vasicine, choline, hypaphorine and betaine. (These alkaloids are also present in aerial parts.) The root also contains alpha-amyrin and an hormone, ecdysterone. Whole plant, as well as the root, contains an alkaloid cryptolepine. Cryptolepine exhibits hypotensive and antimicrobial activity.

The seeds contain 0.26% of the alkaloids and roots 0.066%.

The water-soluble portion of the alcoholic extract of the plant exerts spasmodic action of the smooth muscles of ileum, trachea, uterus and heart of experimental animals. (The activity bears similarity to that of acetylcholine.)

Sida cordifolia Linn.

Family ► *Malvaceae.*

Habitat ► Throughout India in moist places.

English ► Country Mallow.

Ayurvedic ► Balaa (yellow-flowered var.), Sumanganaa, Kharayashtikaa, Balini, Bhadrabalaa, Bhadraudani, Vaatyaalikaa.

Unani ► Bariyaara, Khirhati, Khireti, Kunayi.

Siddha/Tamil ► Nilatutti.

Action ► Juice of the plant—invigorating, spermatopoietic, used in spermatorrhoea. Seeds—nervine tonic. Root—(official part in Indian medicine) used for the treatment of rheumatism; neurological disorders (hemiplegia, facial paralysis, sciatica); polyuria, dysuria, cystitis, strangury and hematuria; leucorrhoea and other uterine disorders; fevers and general debility. Leaves—demulcent, febrifuge; used in dysentery.

Ephedrine and *si*-ephedrine are the major alkaloids in the aerial parts. The total alkaloid content is reported to be 0.085%, the seeds contain the maximum amount. In addition to alkaloids, the seeds contain a fatty oil (3.23%), steroids, phytosterols, resin, resin acids, mucin and potassium nitrate.

The root contains alkaloids—ephedrine, *si*-ephedrine, beta-phenethylamine, carboxylated tryptamines and hypaphorine, quinazoline alkaloids—vasicinone, vasicine and vasicinol. Choline and betaine have also been isolated.

A sitoindoside, isolated from the plant, has been reported to exhibit adaptogenic and immunostimulatory activities. Alcoholic extract of the plant possesses antibacterial and antipyretic propeptide. Ethanolic extract of the plant depresses blood pressure in cats and dogs.

Sida rhombifolia Linn.

Family ► *Malvaceae.*

Habitat ► Throughout India, in moist places.

English ► Common Bala.

Ayurvedic ► Mahaabalaa, Mahaasamangaa, Sahadevaa, Kshetrabalaa.

Unani ► Bariyaara (red-flowered var.).

Siddha/Tamil ► Athi Bala-chedi, Chitrmutti, Tennacham.

Action ► Plant—used as a supporting drug in pulmonary tuberculosis, nervous diseases and rheumatism. Leaves—applied to swelling as paste. Stem-mucilage—demulcent and emollient. Used internally in skin diseases and as a diuretic and febrifuge.

The Ayurvedic Pharmacopoeia of India recommends the root in deficient spermatogensis and oedema.

Alkaloids, ephedrine, *si*-ephedrine and cryptolepine, are reported from aerial parts. The root contains 0.054% alkaloids, beta-phenethylamine, N-methyl-beta-phenethylamine, vasicinol, vasicinone, vasicine, choline and betaine. These alkaloids are also present in the aerial parts.

Alcoholic extract of the root exhibited antibacterial and antipyretic activities.

Proteins, linoleic, malvlic and sterculic acids have been reported from seeds.

Dosage ► Root—3–6 g powder. (*API*, Vol. III.)

Sida rhombifolia Linn. var. **rhomboidea** (Roxb.) Mast

Family ► *Malvaceae.*

Habitat ► West Bengal.

Ayurvedic ► Mahaabalaa (white-flowered var.).

Action ► Plant—spasmolytic, anti-inflammatory. Root—sedative, CNS depressant.

Alkaloids from the plant exhibit antibacterial, antifungal and anthelmintic properties.

See *S. rhombifolia.*

Sida spinosa Linn.

Synonym ► *S. alba* Linn.

Family ► *Malvaceae.*

Habitat ► Throughout the hotter parts of India, ascending to an altitude of 1,350 m.

English ► Prickly Sida.

Ayurvedic ► Naagabalaa, Balaa-kantakini, Gangaati.

Siddha/Tamil ► Arivalmanai-poondu.

Folk ► Gulasakari, Gangeti, Jangali-methi.

Action ► Root—nervine tonic and diaphoretic; used in debility and fevers. Decoction given as a demulcent in irritability of bladder and genitourinary tract. Leaves—demulcent and refrigerant; used for scalding urine.

The root contains alkaloids—beta-phenethylamine, ephedrine, *si*-ephedrine, vasicinol, vasicinone, vasicine, choline, hypaphorine, methyl ester, hypaphorine and betaine. These alkaloids are present in aerial parts as well.

Ethanolic extract of the plant exhibits hypoglycaemic activity. It depressed the normal blood pressure and lowered the activity of smooth muscles of the ileum of experimental animals.

Sida veronicaefolia Lam.

Synonym ► *S. cordata* (Burm. f.) Borssum.
S. humilis Cav.

Family ► *Malvaceae.*

Habitat ► Throughout hotter parts of India.

Ayurvedic ► Raajabalaa, Bhumibalaa, Prasaarini, Suprasaraa (also equated with Naagabalaa, *Grewia hirsuta*).

Siddha/Tamil ► Palampasi.

Folk ► Farid-booti.

Action ► Fruits and flowers—used for burning sensation in micturition. Leaves—juice, used for diarrhoea; poultice applied to cuts and bruises. Root bark—used for leucorrhoea and genitourinary affections.

In experimental animals, the herb prevented arthritic swellings.

The plant contains beta-phenethylamines, quinazoline, carboxylated tryptamine, linoleic acid, malvalic acid, sterculic acid and gossypol.

Dosage ▶ Root—10–20 ml juice; 50–100 ml decoction. (*CCRAS.*)

Siegesbeckia orientalis Linn.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Throughout India up to 2,000 m.

English ▶ The Holy Herb, Siegesbeckia.

Siddha/Tamil ▶ Katampam, Kadambu.

Folk ▶ Pili-badkadi (Gujarat), Latlatiaa (Bihar), Lichkuraa (Garhwal).

Action ▶ Plant—antiscorbutic, sialagogue, cardiotonic, diaphoretic. Used for the treatment of rheumatism, renal colic and ague. Also used as a lotion for gangrenous ulcers and sores, syphilis, leprosy, ringworm.

The aerial parts contain sesquiterpene lactone, orientin; melampolides including orientolide; diterpene, darutigenol and the corresponding glucoside darutoside. The whole plant, in addition, gave 3,7-dimethylquercetin.

The plant exhibited antiviral, CVS active, spasmolytic and hypoglycaemic activity.

Silybum marianum (L.) Gaertn.

Family ▶ *Compositae; Asteraceae.*

Habitat ▶ Western Himalayas at 1,800 and Kashmir at 2,400 m, also grown in gardens.

English ▶ Holy Thistle, Milk Thistle.

Action ▶ Seeds—liver protective, gallbladder protective, antioxidant. Used in jaundice and other biliary affections, intermittent fevers, uterine trouble, also as a galactagogue. Alcoholic extract used for haemorrhoids and as a general substitute for adrenaline. Seeds are used for controlling haemorrhages. Leaves—sudorific and aperient. Young leaves and flowering heads are consumed by diabetics.

Key application ▶ In dyspeptic complaints. As an ingredient of formulations for toxic liver damage; chronic inflammatory liver disease and hepatic cirrhosis induced by alcohol, drugs or toxins. (*Expanded Commission E Monographs, WHO.*)

The seeds gave silymarin (flavanol lignin mixture), composed mainly of silybin A, silybin B (mixture known as silibinin), with isosilybin A, isosilybin B, silychristin, silydianin. In Germany, Milk Thistle has been used extensively for liver diseases and jaundice. Silymarin has been shown conclusively to exert an antihepatotoxic effect in animals against a variety of toxins, particularly those of death cap mushroom, *Amanita phalloides.* Silybin, when given by intravenous injection to human patients up to 48 hours after ingestion of the death cap, was found to be highly effective in preventing fatalities.

Silymarin has been used successfully to treat patients with chronic hepatitis and cirrhosis; it is active against hepatitis B virus, and lowers fat deposits in the liver in animals.

(For hepatic cirrhosis: 420 mg per day; for chronic active hepatitis 240 mg twice daily—extract containing 70–80% silimarin.)

Sisymbrium irio Linn.

Family ► *Cruciferae; Brassicaeae.*

Habitat ► Kashmir, Punjab, Haryana and from Rajasthan to Uttar Pradesh in moist soils.

English ► London Rocket.

Ayurvedic ► Khaaksi.

Unani ► Khuubkalaan.

Action ► Seeds—expectorant, restorative, febrifuge, rubefacient, antibacterial. Used in asthma.

Leaves—rich in vitamin C (176 mg/100 g), beta-carotene (10,000 IU/100 g) and minerals. Used in throat and chest infections.

Aerial parts yield beta-sitosterol, 3 beta-D-glucoside, isorhamnetin and quercetin.

The seed contains a flavonoid, *iso*-rhamnetin. Fatty oil from seeds contain linolenic and oleic acids (as chief constituents), along with erucic, palmitic and stearic acids.

Ethanolic extract of seeds exhibited marked antibacterial action, also antipyretic and analgesic effects.

S. loeselii Linn. (Kashmir and Himachal Pradesh) is used in scrofula and as an antiscorbutic. The seed oil contains erucic acid and larger amounts of tetracosenoic acid. The plant contains alkaloids, organic acids, tannins, glycosides, saponins, coumarins and flavonoids.

Smilax aristolochiaefolia Miller.

Family ► *Liliaceae; Smilacaceae.*

Habitat ► Native to tropical America and the West Indies.

English ► Sarsaparilla.

Unani ► Ushbaa Maghrabi (Ushbaa Desi is equated with *Decalepis hamiltonii*.)

Action ► Alterative, anti-inflammatory, antipruritic, blood purifier, antiseptic. (It was first introduced in 1563 as a drug for syphilis.)

In Western herbal, Sarsaparilla is equated with Smilax aristolochiaefolia (American, Mexican, Vera Cruz or Grey Sarsaparilla); *S. medica, S. regelii* (Jamaican, Honduras or Brown Sarsaparilla); *S. febrifuga* (Ecuadorian or Guayaquil Sarsaparilla). *Hemidesmus indicus* is equated with Indian Sarsaparilla.

Key application ► Preparations of sarsaparilla root are used for skin diseases, psoriasis and its sequel, rheumatic complaints, kidney diseases, and as a diaphoretic and diuretic. (The claimed efficacy has not been established clinically.) Included among unapproved herbs by *German Commission E.*

S

The roots and rhizomes of sarsaparilla contain saponins based on aglycones sarsapogenin and smilagenin, the major one being parillin (sarsaponin), with smilasaponin (smilacin) and sarsaparilloside; beta-sitosterol, stigmasterol and their glucosides. Chief components of saponins (0.5–3%) are sarsaparilloside, along with parillin as a breakdown product. Parillin shows antibiotic activity.

Sarsaparilla root sterols are not anabolic steroids, nor are they converted *in vivo* to anabolic steroids. Testosterone, till now, has not been detected in any plant including sarsaparilla. Hemidesmus indicus contains none of the saponins or principal constituents found in sarsaparilla. (*Natural Medicines Comprehensive Database*, 2007.)

Smilax aspera Linn.

Family ► *Liliaceae.*

Habitat ► The tropical and temperate regions, from Kashmir, Sikkim and Assam to South India.

English ► Italian Sarsaparilla.

Action ► Roots used as a substitute for *Hemidesmus indicus*. Rutin has been isolated as a major flavonoid from the plant.

Smilax china Linn.

Family ► *Liliaceae.*

Habitat ► Japan, China and Cochin China.

English ► China Root.

Ayurvedic ► Chobachini, Chopachini, Dweepaantar-Vachaa, Madhusnuhi, Hriddhaatri.

Unani ► Chobchini.

Siddha/Tamil ► Parangi chakkai.

Action ► Tubers—used as alterative in venereal diseases, chronic skin diseases and rheumatic affections. Used as official sarsaparilla. (China of homoeopathic medicine is Peruvian bark, not *Smilax china*.)

Sarsaparilla (*Smilax* species) is used in Oriental as well as in Western herbal for its alterative, gentle circulatory stimulant and mild testosterone activity.

The root is known for its steroidal saponins. Pro-sapogenin-A of dioscin, dioscin, gracillin. Me-protogracillin, Me-protodioscin and its 22-hydroxyanalog; besides beta-sitosterol glucoside, smilaxin, two furostan and one spirostane glycosides have been isolated from the root.

Dosage ► Root—50–100 mg powder. (*CCRAS.*)

Smilax glabra Roxb.

Family ► *Liliaceae.*

Habitat ► Assam, Khasi and Garo Hills, eastwards to upper Burma, Indo-China and southern China.

Ayurvedic ► Dweepaantara-Vachaa, Chobachini (bigger var.).

Action ► Roots—used for syphilis, venereal diseases and sores, as a blood purifier.

S

Astilbin, 3-O-caffeoyl-shikimic, ferulic, palmitic, shikimic and succinic acids; engeletin, isoengeletin; glucose; daucosterol, beta-sitosterol, stigmasterol are major constituents of the root.

Crude saponins, isolated from the plant, produced preventive effect on cholesterol-fed atherosclerosis in quails.

Smilax lanceifolia Roxb.

Family ► *Liliaceae.*

Habitat ► Sikkim Himalayas, Assam and Manipur.

Ayurvedic ► Hindi Chobachini.

Folk ► Shukchin (Maharashtra), Hariaa.

Action ► Roots—used for rheumatic affections.

Smilax ornata Hook.

Family ► *Liliaceae.*

Habitat ► Tropical Himalayas from Kumaon eastwards to Khasi, Garo and Naga Hills, and in Bihar.

Unani ► Ushbaa. (Jamaica saksaparilla.)

Action ► Roots—used as a blood purifying drug.

Smilax ovalifolia Roxb.

Synonym ► *S. macrophylla* Roxb.

Family ► *Liliaceae.*

Habitat ► Tropical parts of India.

Ayurvedic ► Maitri.

Unani ► Ushbaa (wild species).

Folk ► Ghot-vel (Maharashtra).

Action ► Roots—used as a substitute for *Hemidesmus indicus.* Used for venereal diseases, urinary infections, rheumatism. Also used for dysentery. (*S. perfoliata* Lour., synonym *S. prolifera* Roxb. is used as a substitute for *S. ovalifolia.*)

Smilax zeylanica Linn.

Family ► *Liliaceae.*

Habitat ► Tropical parts of India including hills. Common in eastern Himalayas.

Unani ► Jangali Ushbaa.

Siddha/Tamil ► Malai-thaamara.

Action ► Root—used in prescriptions for venereal diseases. Decoction, used for abscesses, boils, swellings and rheumatism; also for dysentery. Used as a substitute for *S. ornata.*

Diosgenin is reported from the root and leaf.

Solanum aculeatissimum Jacq.

Family ► *Solanaceae.*

Habitat ► Assam and Kerala, in damp and waste places.

Ayurvedic ► Brihati (related species, used in Kerala). Brihati and Kantakaari have been used in Indian medicine as synonyms.

Action ► Both fruit and leaves contain glycoalkaloid solanine; immature fruits contain more of it than the ripe ones. Air-dried leaves and fruits contain 0.26 and 0.14% of alkaloids, respectively.

See *S. indicum* Linn.

Solanum albicaule Kotschy ex Dunal.

Family ► *Solanaceae.*

Habitat ► Saurashtra (Gujarat) and Rajasthan.

Ayurvedic ► Brihati (related species).

Folk ► Narkanta (Rajasthan).

Action ► A decoction of the plant is prescribed for the treatment of ulcers.

See *S. indicum* Linn.

Solanum aviculare Forst. f.

Family ► *Solanaceae.*

Habitat ► Introduced to Kashmir for experimental cultivation.

Ayurvedic ► Kantakaari (related species).

Action ► An important source of solasodine, a nitrogen analogue of diosgenin and one of the starting materials for the synthesis of corticosteroids and other steroidal hormones.

See *S. xanthocarpum.*

The leaves, stems, flowers and green fruits contain the glycoalkaloid, solasonine, of which solasodine is the aglycone. Besides solasonine, the plant contains solamargine and solasodamine. The average alkaloidal content (calculated as solasodine) of leaves collected from Kashmir, is reported to be 0.3% (dry weight basis).

Solanum dubium Fresen.

Family ► *Solanaceae.*

Habitat ► Sandy coast of Saurashtra (Gujarat).

Ayurvedic ► Kantakaari (related species).

Action ► Seeds are soaked and eaten in Africa for the treatment of venereal diseases.

See *S. xanthocarpum.*

Solanum dulcamara Linn.

Family ► *Solanaceae.*

Habitat ► The temperate Himalayas from Kashmir to Sikkim at altitudes of 1,200–2,400 m.

English ► Woody Night Shade, Bittersweet, Bitter Nightshade, Felonwort.

Ayurvedic ► Kaakamaachi-vishesha, Valli-kantakaarikaa.

Unani ► Mako (red var.).

Action ► Twigs and root bark—stimulating, expectorant, hepatic, astringent, antirheumatic, alterative, antifungal. Dried branches—sedative and analgesic. Used for chronic bronchitis, chronic eczema and rheumatism.

Key application ► As a supportive therapy for chronic eczema. (*German Commission E.*)

The plant is rich in alkaloidal glycosides. Alpha-, beta-, gamma-solamarine were isolated from the fruits. Tomatidenol I existed in the plant as alpha- and beta-solamarine. Solasodine was obtained in traces as secondary alkaloid; it existed as solasonine and solamargine. Aerial parts gave alpha-and beta-soladulcine, the glycoalkaloids. The sterols were present in free form and as esters, glucosides and palmitic esters of glucosides.

Beta-solamarine shows significant tumour-inhibiting activity. Steroidal saponins are antifungal; alkaloids are anticholinergic; solasodine exhibit antiphlogistic activity.

Solanum elaeagnifolium Cav.

Family ► *Solanaceae.*

Habitat ► Native to tropical America; naturalized in India as a weed (met with in cultivated fields and gardens in Coimbatore).

English ► White Horse-Nettle.

Action ► Plant—used as a poultice for sores and ulcers. The plant is a rich source of the steroidal alkaloid, solasodine. The fruit and leaves contain 3–4% (solasodine 3.2%) and 0.18% total alkaloids. Fruits also contain 0.55% diosgenin.

A related species *S. khasianum* (Assam, Sikkim, West Bengal, Orissa and the Nilgiris, ascending to an altitude of 1,600 m) is also a good source of solasodine. The fruits collected from Nilgiris contain 5.4% solasodine on dry weight basis.

Solanum erianthum D. Don.

Synonym ► *S. verbascifolium* auct. non Linn.

Family ► *Solanaceae.*

Habitat ► The tropical and subtropical India and the Andamans. Cultivated in South India. (for berries).

Folk ► Chundai (Tami Nadu, Kerala); Rasagadimaanu (Andhra Pradesh); Sowdangigida, Kadusinde (Karnataka); Kutri (Maharashtra). Vidaari is a confusing synonym (used by *The Wealth of India*). (Vidaari is equated with *Purerariа tuberosa.*)

Action ► Roots—a decoction is prescribed for vertigo. Leaves—prescribed for vaginal discharges. Various plant parts are ground with warm water and applied externally to lessen inflammation, burning sensation and pain. The glycoalkaloid, solasonine is present in the leaves and fruits.

Solanum ferox Linn.

Family ► *Solanaceae.*

Habitat ► Throughout warmer parts of India, up to an elevation of 1,500 m.

English ► Poison-Berry.

Ayurvedic ► Brihati, Brihatikaa, Mahati, Hinguli, Prasaha, Vartaki, Kaantaa, Kshudra-bhantaki, Simhi, Bana-bhantaa. Kateri (bigger var.)

Unani ► Katai Kalaan.

Siddha/Tamil ► Mulli, Pappara-mulli, Karimulli.

Folk ► Raam-begun (Bengal).

Action ► Plant and root—stimulant, digestive, carminative, astringent, expectorant, diaphoretic, anthelmintic. Used for catarrhal affections, asthma, dry cough; dysuria; intestinal worms; colic, flatulence, vomiting. Berries—used in asthma and rheumatism.

Air-dried fruits and leaves contain solanine; 0.30 and 0.43% of total alkaloids respectively.

Dosage ► Fruit, root—3–6 g powder; 50–100 ml decoction. (*CCRAS.*)

Solanum indicum Linn.

Family ► *Solanaceae.*

Habitat ► Throughout India in the plains and foot hills.

English ► Poison Berry.

Ayurvedic ► Brihati, Kshudra-bhantaaki, Kateri (bigger var.).

Unani ► Hadaq, Kataai Kalaan.

Siddha ► Mullamkatti, Papparamulli (root).

Folk ► Barahantaa.

Action ► Root—carminative, expectorant; used for colic, dysuria, coughs and catarrhal affections.

A decoction is prescribed in difficult parturition.

The fruits and leaves contain glycoalkaloid, solasonine; the presence of solanine in roots, leaves and fruits has been reported. Diosgenin is also present in leaves, stems and fruits.

The total alkaloid content of fruit varies from 0.2 to 1.8% (dry weight basis); plants growing in Jammu and Kashmir bear fruits with high alkaloid content (total alkaloid 1.8%).

An alcoholic extract of fruits is active against *Staphylococcus aureus* and *E. coli.* The extract of leaves is also active against *E. coli.*

The bigger var. of Kateri (Indian Nightshade) is also equated with *S. anguivi* Lam., synonym *S. indicum* auct. non L. It contains salasonine, diosgenin, beta-sitosterol, lanosterol, solamargine, solasodine and tomatidenol. The seed oil contains carpestrol.

Dosage ► Root—10–20 g for decoction. (*API*, Vol. II.)

Solanum melongena Linn.

Family ► *Solanaceae.*

Habitat ► Native to India; cultivated throughout India.

English ► Eggplant, Brinjal.

Ayurvedic ► Bhantaki, Bhantaa, Vaartaaka, Vaartaaku, Vaartaakini, Vrintaaka.

Unani ► Baingan.

Siddha/Tamil ► Kathirikai.

Folk ► Baingan, Bhantaa.

Action ► Fruit—recommended in liver complaints and for amenorrhoea. The fruit is reported to stimulate the intrahepatic metabolism of cholesterol, produces a marked drop in blood cholesterol level. Aqueous extract of fruit is reported to inhibit choline esterase activity of human plasma. Root—anti-asthmatic. Leaves—toxic; used mostly externally for the treatment of burns, cold sores and abscesses. Seeds—anticholesterolemic.

Steroidal saponins, melongosides were isolated from seeds; tigogenin, diosgenin were also obtained. Quercetin, 3-O-rhamnoside and kaempferol-3-O-rutinoside have been isolated from the leaves. The ethanol extract (80%) showed anti-inflammatory activity in paw oedema and cotton pellet method in rats. Crude extract of fruits showed diuresis and dose-dependent hypotensive response in normotensive rats. Ether-soluble methanolic extract exhibited strong inhibitory activity on lipoxygenase, involved in atherosclerotic processes and platelet aggregation in rats.

Solanum melongena Linn. var. *incanum* Kuntze, synonym *S. coagulans* Forsk. is known as Bana-bhantaa (also a synonym of *Solanum ferox*) and is used as Brihati in Kerala. Air-dried fruits and leaves from coimbatore contain 1.05 and 0.97% of alkaloids respectively. The fruits contain solasodine, campesterol and beta-sitosterol. Solamargine, solasodine, ursolic acid and its derivatives exhibited significant cytotoxic effects against human P2C/PRF/5 cells *in vitro*.

Solanum nigrum Linn.

Synonym ► *S. rubrum* Mill.

Family ► *Solanaceae.*

Habitat ► Throughout India, in dry parts, up to an elevation of 2,100 m.

English ► Black Nightshade.

Ayurvedic ► Kaakamaachi, Kaakaahya, Kaakamaataa, Dhvankshamaachi.

Unani ► Mako (smallar var., black var.)

Siddha/Tamil ► Manittakkali.

Action ► Plant—anti-inflammatory, antispasmodic, sedative, diuretic, laxative, antiseptic; fresh extract is used for inflammatory swellings, enlargement of liver and spleen and in cirrhosis of liver. Berries—antidiarrhoeal, antipyretic. Berries and flowers—prescribed in cough and cold. Leaves— applied hot to swollen testicles; paste used as poultice to gout, rheumatic swellings and skin diseases.

The berries contain steroidal alkaloid glycosides, solasonine, alpha- and beta-solanigrine, alpha-and beta-solamargine; steroidal sapogenins, diosgenin and tigogenin; solasodine and solasodine.

Solamargine and solasonine are present also in leaves. The total alkaloid content of fruits and leaves are 0.101 and 0.431% respectively.

Dosage ► Whole plant—5–10 ml juice. (*API,* Vol. II.)

Solanum spirale Roxb.

Family ► *Solanaceae.*

Habitat ► Assam, Khasi Hills. Banga (Bengal); Titakuchi (Assam); Sohjhari (Khasi); Mungas-kajur (root, Bihar).

Action ► Root—diuretic, narcotic. Unripe berries—poisonous.

The leaves contain 1.29% alkaloids. Partial synthesis of etiolin has been reported.

Solanum torvum Sw.

Family ► *Solanaceae.*

Habitat ► Throughout tropical parts of India, in waste places.

English ► West Indian Turkey Berry.

Ayurvedic ► Brihati (White-flowered-var.), Goshtha-vaartaaku.

Siddha/Tamil ► Chundai.

Folk ► Ran-Baingan, Goth-begun.

Action ► Plant—digestive, diuretic, sedative. Leaves—haemostatic. Fruits—useful in liver and spleen enlargement (cooked and eaten as a vegetable); decoction used for cough. Root—used for poulticing cracks in feet.

Unripe fruits and leaves contain the glycoalkaloid, solasonine (0.37% total alkaloids in air-dried fruits of the plant from Khasi and Jaintia hills). Hydrolysis of the neutral glucosidal fraction yields a steroidal sapogenin, chlorogenin, which is rare in *Solanum* sp.

The fruits gave sitosterol-D-glucoside.

Extracts of the plant affect the rate and amplitude of respiration, also blood pressure. They also contract isolated ileum of guinea-pig. Leaves contain no vitamin K or derivatives of naphthoquinone; their haemostatic action may be due to the oil or pectins or both.

Solanum trilobatum Linn.

Family ► *Solanaceae.*

Habitat ► Deccan Peninsula.

English ► Climbing Brinjal.

Ayurvedic ► Alarka, Vallikantakaarikaa, Kantakaari-lataa.

Siddha/Tamil ► Toothuvilai.

Action ► Berries and flowers—a decoction is used for cough and chronic bronchitis.

The steroidal alkaloid, solasodine, is present in fruit and leaf of the plant (air-dried fruits and leaves from Coimbatore gave 0.96 and 0.36% respectively). A crude glycoalkaloid mixture, isolated from the plant material, contained about 20% beta-solamarine. The plant exhibited antimitotic, antitumour, antibacterial and antifungal activities and showed promising results in two cancer test systems—KB cell and sarcoma 180 in mice.

Solanum tuberosum Linn.

Family ► *Solanaceae.*

Habitat ► Native to South America; grown almost throughout India.

English ► Patoto.

Ayurvedic ► Aaluka, Aaruka, Golaalu. (Aaluka, yam of Indian medicine, is equated with species of *Dioscorea*.)

Folk ► Aaluu.

Action ► Potatoes are consumed as food. Extract of leaves is used as antispasmodic in cough. Potato juice is given as an adjuvant in the treatment of peptic ulcer for bringing relief from pain and acidity. Starch and very small quantities of atropine alkaloids reduce digestive secretions and stomach acids. Potatoes are good for patients suffering from hyperacidity; boiled potatoes make an excellent diet for those having hypertension.

Solanum xanthocarpum S. & W.

Synonym ► *S. surattense* Burm.f.
S. virginianum Linn.
S. maccanni Sant.

Family ► *Solanaceae.*

Habitat ► Throughout India.

English ► Wild Eggplant, Yellow-Berried Nightshade.

Ayurvedic ► Kantakaari, Kantakaarikaa, Vyaaghri, Nidigdhikaa, Nidigdhaa, Duhsparshaa, Dhaavani, Kshudraa, Keteri (Smallar var.), Bhatakataiyaa. Used as Lakshmanaa.

Unani ► Kataai Khurd, Hadaq.

Siddha/Tamil ► Kandankatthiri.

Action ► Stimulant, expectorant, diuretic, laxative, febrifuge. Used in the treatment of cough, bronchitis, asthma, for dislodging tenacious phlegm; also used against rheumatism, enlargement of liver and spleen, vomiting, difficult urination, bladder stones, skin diseases. Fruit—used as an adjuvant for promoting conception.

Fruits gave solasonine, solamargine, beta-solamargine and solasodine; petals yielded apigenin; stamens gave quercetin diglycoside and sitosterol. The glycoalkaloid content of fruits collected from Jammu and Kashmir is reported to be 3.5% (total alkaloids, 1.1%). The presence of diosgenin in the plant has been reported.

Both glycoalkaloid and fatty acid fractions of the plants extracts cause liberation of histamine from chopped lung tissue. The beneficial effect of the drug on bronchial asthma may be attributed to the depletion of histamine from bronchial and lung tissue.

Dosage ► Whole plant—20–30 g for decoction. (*API,* Vol. I.)

S

Solidago virga-aurea Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► The temperate Himalayas from Kashmir eastwards and in Khasi Hills, up to 3,000 m.

English ► European Goldenrod, Woundwort.

Action ► Anticatarrhal, diaphoretic, anti-inflammatory, antiseptic to mucous membranes.

Key application ► In irrigation therapy for inflammatory diseases of the lower urinary tract, urinary calculi and kidney gravel. (*German Commission E.*) *ESCOP* also indicates its use as an adjuvant in the treatment of bacterial infections of the urinary tract.

Anti-inflammatory activity is due to phenolic glycosides; antifungal activity is due to saponins based on polygalic acid (acts specifically against the *candida* fungus, the cause of vaginal and oral thrush). As a diuretic, aerial parts are used for nephritis and cystitis and to flush out kidney and bladder stones; urine volume is increased but not sodium excretion.

The plant contains quercitrin, rutin, iso-quercitrin, astragalin, kaempferol, rhamnoglucoside, quercetin, caffeic acid and chlorogenic acid. Aerial parts contain diterpenoids of *cis*-clerodane lactone group.

S

Sonchus arvensis Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Waste places and fields throughout India, up to an altitude of 2,400 m.

English ► Corn Sow Thistle.

Ayurvedic ► Sahadevi (bigger var.). (*Vernonia cinerea* is equated with Sahadevi.)

Action ► Plant—sedative, hypnotic, anodyne, expectorant, diuretic. Used for nervous debility. Seeds—used for asthma, bronchitis, cough, pertussis, fever; decoction in insomnia. Leaves—applied to swellings. Root—used for diseases of the respiratory tract.

The plant contains amino acids, lipids, polymeric hydrocarbons, polyphenols, protein; alpha- and beta-amyrins, lupeol, pseudotaraxasterol, taraxasterol. The latex contains mannitol, alpha-and beta-lactucerols. Aerial parts and fruits contain ceryl alcohol, choline, palmitic, tartaric and stearic acids.

Sonchus asper Hill

Family ► *Compositae; Asteraceae.*

Habitat ► Waste places and fields throughout India, up to elevation of 3,600 m.

English ► Spinyleaved Sow Thistle.

Ayurvedic ► Sahadevi (bigger var.).

Folk ► Didhi, Mhaataaraa (Maharashtra).

Action ► Emollient. Pounded and applied to wounds and boils.

The latex contains rubber, alpha- and beta-lactucerols, ceryl alcohol, mannitol and traces of acetic acid. The whole plant contains the sesquiterpene glycosides and ionone glycosides. Ascorbic acid (27 mg/100 g) is present in the plant.

Sonchus oleraceus Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Waste places throughout India, up to elevation of 2,400 m.

English ► Milk Thistle (a confusing synonym. *Silybum marianum* has been equated with Milk Thistle.)

Folk ► Duudhi, Dodaka, Dudhaali.

Action ► Galactagogue, febrifuge, sedative, vermifuge. Used in indigestion and in the treatment of diseases of the liver. An ointment is made from the decoction for wounds and ulcers.

The leaves contain luteolin, luteolin-7-O-glucoside; hydroxycoumarins, cichoriin and scopoletin. Apigenin-7-O-glucoside was also obtained from the leaves and stems. Young leaves are reported to contain 4.1 mg/100 g of vitamin C.

Sonneratia caseolaris Engl.

Family ► *Sonneratiaceae.*

Habitat ► Tidal creeks and mangrove swamps of India.

Folk ► Orchaa (Bengal), Tivar, Chipi (Maharashtra).

Action ► Fruit—fermented juice is used for arresting haemorrhage. Juice of unripe fruit is given in cough. Fruit is also used as a poultice in sprains and swellings. Fruit wall—vermifuge.

The stem bark and root bark contain 9–17 and 11.0 to 11.9% tannin of the pyrogallol class.

The fruit yields 11% pectin on dry basis.

Sophora japonica Linn.

Family ► *Papilionaceae, Fabaceae.*

Habitat ► Kashmir; also introduced into forest Research Institute, Dehra Dun.

English ► Japanese Pagoda tree, Chinese Scholar tree, Umbrella tree.

Action ► Flower—bitter, astringent, styptic, antibacterial.

Flower buds are a very rich source of rutin (16.0–23.0% dry weight basis), several times more than that present in Buckwheat which is an important source of the flavonoid.

The plant is used for the treatment of bleeding due to hemorrhoids and ulcerative colitis. The antihaemorrhagic principle, quercetin, has been isolated from aqueous extract of dried buds.

The flower extract has been reported to exhibit hepato-protective activity.

Sophora mollis Grah. ex Baker.

Synonym ► *Edwardsia moltis* Royle.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Himalayas from Kashmir to Nepal, up to an altitude of 2,100 m.

English ► Himalayan Laburnum.

Action ► Seeds—used for destroying vermin. Root—used for promoting hair growth.

The seeds contain an alkaloid cytisine. The root imparts dark colour to hair.

The seeds of *S. secundiflora* Lag. ex DC., known as Mescal-or Coral-Bean (Native to America, grown in Indian gardens) also contain substantial amounts of cytisine.

The alkaloid, (−)-N-methylcytisine, isolated from the seeds, exhibited hypoglycaemic activity in mice.

Sophora tomentosa Linn.

Family ► *Popilionaceae; Fabaceae.*

Habitat ► Grown in gardens for its bright-yellow flowers.

English ► Sea coast Laburnum, Silver Bush.

Action ► Seeds—dangerously emetocatharitc, toxic, febrifugal, stomachic. Seeds yield a fatty oil with expectorant properties. Decoction of seeds and roots is given in bilious disorders. Leaves—emetocathartic.

Constituents of the aerial parts include benzofurans; flavonoids including sophoraisoflavone A and B, sophoronol, *iso*-sophoranone-and *iso*-bavachin. The leaves and seeds contain alkaloids—matrine, cytisine and small amounts of methylcytisine. Cytisine is also present in the roots.

Cytisine possesses insecticidal and physiological properties similar to those of nicotine.

Sophoraisoflavone A exhibits antifungal activity.

Sopubia delphinifolia G. Don.

Family ► *Scrophulariaceae.*

Habitat ► Western India, as a root parasite.

Folk ► Dudhaali (Maharashtra).

Action ► Root—juice applied to sores on feet, caused by constant exposure to water and moisture.

Alcoholic extract of air-dried powdered stems yielded isoflavonoids, which were found to be estrogenically active in albino rats.

Sorbus aucuparia Linn.

Family ► *Rosaceae.*

Habitat ► Native to Europe and Asia; distributed in temperate Himalayas from Kashmir to Kumaon.

English ► European Mountain Ash, Rowan tree, Mountain Ash Berry.

Folk ► Battal (Punjab), Syaar (Garhwal).

Action ► Fruits—antiscorbutic, depurative, diuretic, astringent, aperient, emmenagogue. An infusion is given in haemorrhoids, strangury and irritation of bladder; for disorders of the uric acid metabolism, for dissolution of uric acid deposits; and for alkalization of the blood ("blood purification"). (Seeds contain cyanogenic acid; should be removed before the fruit is used.) Leaves—laxative; used as a pectoral in cough and bronchitis. Bark—astringent. Decoction is given in diarrhoea. (It is said to produce irritation of the alimentary mucous membrane.)

Included among unapproved herbs by *German Commission E.*

The fruit gave ursolic acid, parasorboside, quercetin, iso-quercetin, rutin and anthocyanins.

Candied fruit may contain 30–40 mg/100 g of vitamin C and concentrates up to 240 mg/100 g. Fresh fruit contains vitamin C 39–74 mg, carotene 6.2–9.8 mg/100 g.

Amygdalin (34.27–61.70 mg/100 g) and hydrocyanic acid (2.02–3.72 mg/100 g) are reported to be present in frozen fruit.

Leaves, buds, young twigs and bark contain amygdalin; tannin (4.47%); triterpenoids; sorbose, sorbitol and sorbic acid.

Sorghum vulgare (Linn.) Pers.

Synonym ▶ *Andropogon sorghum* Brot.

Family ▶ *Gramineae; Poaceae.*

Habitat ▶ Cultivated throughout warmer parts of India.

English ▶ Sorghum, Broomcorn.

Ayurvedic ▶ Yaava-naala.

Siddha/Tamil ▶ Makkaseelam.

Folk ▶ Jowaar, Paneraa.

Action ▶ Grains—demulcent, diuretic. A confection of grains and Foeniculum vulgare seeds is used as a galactagogue. Sorghum is inferior to wheat.

About 80% of sorghum in India belongs to the race Durra (*Sorghum durra* (Frosk.) Stapf.).

Soymida febrifuga A. Juss.

Family ▶ *Meliaceae.*

Habitat ▶ Peninsular India, Rajasthan and Bihar.

English ▶ Indian Red-Wood, Bastard Cedar.

Ayurvedic ▶ Maansrohini, Rohini, Rohinaa, Prahaarvalli.

Siddha/Tamil ▶ Somi-maram, Wond.

Action ▶ Bark—antipyretic (particularly prescribed in malaria), bitter tonic in general debility, astringent (used for diarrhoea and dysentery); used as a gargle in stomatitis, applied to rheumatic swellings. The bark is much inferior to cinchona bark, but a good substitute for oak bark.

The plant contains mainly tetranor-triterpenoids and flavonoids. The heartwood gave febrifugine A and B, febrinins A and B; flavonoids—naringenin, quercetin, myricetin and dehydromyricetin. The Root heartwood yielded sitosterol, obtusifoliol, syringetin and dihydrosyringetin. The bark contains tetranor-triterpenoids with modified furan ring.

Petroleum ether extract of the bark yielded a steroid, methyl angolensate, ether extract yielded a steroid glycoside.

Dosage ▶ Bark—3–5 g powder. (*CCRAS.*)

Spathodea campanulata Beauv.

Family ▶ *Bignoniaceae.*

Habitat ► Native to tropical Africa. Grown as a avenue tree, in Coffee estates for shade.

English ► Syringe tree, Fountain tree, African Tulip tree.

Siddha/Tamil ► Patadi.

Folk ► Ruugatuuraa.

Action ► Bark—decoction given for dysentery, gastro-intestinal and renal ailments. Pulverized bark applied to skin diseases. Leaves—infusion administered for urethral inflammation.

The stem bark gave oleanolic and siaresinolic acids. The bark yields small quantities of tannin. Leaves gave caffeic and chlorogenic acids, quercetin-3-galactoside. Flowers gave malvidin and pelargonidin diglycoside.

An aqueous alcoholic extract of the leaves and the hexane and chloroform extracts of stem bark showed anti-malarial activity.

S

Spergularia rubra (Linn.) J. Persl & C. Persl.

Synonym ► *Spergula rubra* D. Dietr.

Family ► *Caryophylaceae.*

Habitat ► Native to Southern France and Malta; found in Punjab and Western Uttar Pradesh.

English ► Sand-Spurry, Sandwort, Arenaria Rubra.

Action ► Diuretic. Used in cystitis and urethral colic, dysuria and urinary calculi.

Spermacoce hispida Linn.

Synonym ► *Borreria articularis* (Linn. f.) F.N. Williams.
Borreria hispida (L.) K. Schum.
Spermacoce articularis L. f.

Family ► *Rubiaceae.*

Habitat ► The Himalaya, from Simla westwards to Assam and southwards to Kanyakumari.

Ayurvedic ► Madana Ghanti.

Siddha/Tamil ► Nellichoori.

Action ► Leaves—an extract is given as an astringent in haemorrhoids and gall stones. Seeds—demulcent; given in diarrhoea and dysentery. Root—prescribed as a mouthwash to cure toothache. A decoction of the herb is used in the treatment of headache.

The weed is rich in calcium and phosphorus; contains beta-sitosterol, ursolic acid and D-mannitol.

The plant gave alkaloid borreline, along with beta-sitosterol, ursolic acid and iso-rhamnetin.

Sphaeranthus indicus Linn. (also auct. non L.)

Synonym ► *S. senegalensis* DC.
S. hirtus Willd.

Family ► *Compositae; Asteraceae.*

Habitat ► Tropical parts of India, in rice fields, cultivated lands as a weed.

Ayurvedic ► Mundi, Mundika, Munditikaa, Bhuukadamba, Alambusta, Shraavani, Tapodhanaa.

(Mahamundi, Mahaa-shraavani is equated with *S. africanus* Linn.)

Unani ► Mundi.

Siddha/Tamil ► Kottakarthai.

Folk ► Gorakh-mundi.

Action ► Juice—styptic, emollient, resolvent. Also used in hepatic and gastric disorders. Seeds and root—anthelmintic. Decoction is used in cough and other catarrhal affections and chest diseases. Root bark—given in bleeding piles. Flowers—blood purifier, alterative, depurative.

The Ayurvedic Pharmacopoeia of India recommends the dried leaf in cervical lymphadenitis, chronic sinusitis, migraine, epilepsy, lipid disorders, diseases of spleen, anaemia, dysuria.

The drug is mostly administered in the form of its steam-distillate. Steam distillation of fresh flowering herb yields an essential oil containing methyl chavicol, alpha-ionone, *d*-cadinene, *p*-methoxycinnamaldehyde as major constituents. A bitter alkaloid, sphaeranthine, has been reported in the plant.

Capitula contains albumin, a fatty oil (up to 5%), reducing sugars, tannins, mineral matter, a volatile oil (0.07%), and a glucoside. No alkaloid was detected in the inflorescence. The glucoside on hydrolysis gave a aglycone, phenolic in nature. The unsaponifiable matter of the fatty oil showed beta-sitosterol, stigmasterol, *n*-triacontanol, *n*-pentacosane and hentriacontane. The essential oil is active against *Vibrio cholera* and *Micrococcus pyogenes* var. *aureus.* The flower heads gave beta-D-glucoside of beta-sitosterol.

Eudesmanolides, cryptomeridiol and 4-epicryptomeridiol have been isolated from flowers.

Flowers gave a sesquiterpene glycoside, sphaeranthanolide, which exhibited immune stimulating activity.

Dosage ► Leaf—3–6 g (*API,* Vol III); whole plant—10–20 ml Juice (*API,* Vol. IV).

Spilanthes calva DC.

Synonym ► *S. acmella* auct. non (L.) Murr.
S. paniculata auct. non-DC.
S. pseudoacmella auct. non (L.) Murr.

Family ► *Asteraceae.*

Habitat ► Tropical and sub-tropical parts of India, in waste places and open moist fields.

English ► Paracress.

Ayurvedic ► Marahattikaa.

Folk ► Marethi, Desi Akarkaraa.

Action ► Plant—antidysenteric. Decoction, diuretic and lithotriptic, also used in scabies and psoriasis. Seeds—used in xerostomia, throat infections and neurological affection of tongue. Root—purgative.

Whole plant gave alpha-and beta-amyrin ester, myricyl alcohol, stigmasterol and its glucoside. A tincture made from flower heads is used as a substitute for the tincture of pyrethrum to treat inflammation of jaw-bones and caries.

Ethanolic extracts of the herb were found to affect the blood pressure of dogs and cats, and also the isolated ileum of guinea pigs. Spilanthol, obtained from the ether as well as pentane extracts, shows a strong sialogogic action, acts as a local anaesthetic and a powerful insecticide.

Spilanthes oleracea Murr.

Family ► *Compositae; Asteraceae.*

Habitat ► Introduced from Brazil; often cultivated in Indian gardens.

English ► Brazilian Cress, Para Cress.

Ayurvedic ► Mahaaraashtri, Marethi, Desi Akarkaraa. Aakaarakarabha of Ayurvedic medicine and Aaqarqarha of Unani medicine is equated with *Anacyclus pyrethrum* DC. (root is used); *S. acmella* and *S. oleracea* flowering heads are used as Desi Akarkaraa and should not be confused with the original drug.

Action ► Flowers—used against scurvy, gum troubles, toothache and against bladder pains and gout.

S

The flower heads yield 1.25% of spilanthol from the pentane extract.

The fresh plant yields an essential oil consisting mainly of spilanthol and a hydrocarbon, spilanthene. The plant also contains cerotic acid, crystalline phytosterols, tannic acid, resin, potassium malate and large amounts of choline and potassium nitrate.

Spinacia oleracea Linn.

Synonym ► *S. tetrandra* Roxb.

Family ► *Chenopodiaceae.*

Habitat ► Native to South-west Asia; cultivated throughout India.

English ► Garden Spinach.

Ayurvedic ► Paalankikaa, Paalankya, Paalakyaa.

Unani ► Paalak.

Siddha/Tamil ► Vasaiyila-keerai.

Action ► Seeds—cooling and laxative; given during jaundice. Spinach, as a potherb, is rich in nitrogenous substances, hydrocarbons and iron sesqui-oxide.

Aerial parts afforded rutin, hyperoside, astragalin and caffeic, chlorogenic, neochlorogenic and protocatechuic acids. Seeds contain glycoprotein-bound hexosamine. Roots contain spirasaponins.

Spondias pinnata (Linn. f.) Kurz.

Synonym ► *S. mangifera* Willd.

Family ► *Anacardiaceae.*

Habitat ► A small, aromatic tree occurring wild or grown throughout the country for edible fruits.

English ► Hog-Plum, Wild Mango. Great Hog-Plum is equated with *S. cytherea* Sonn, synonym *S. dulcis* Soland. ex Forst. f.

Ayurvedic ► Aamraataka, Aamraata, Aamadaa, Madhuparni, Kundalini, Kapitana, Markataamra.

Siddha/Tamil ► Mambulichi, Kattuma.

Folk ► Jangali Aam.

Action ► Fruits, leaves, bark—astringent, antidysenteric, antiseptic, antiscorbutic. Bark paste applied externally to articular and muscular rheumatism. Root—used for regulating menstruation.

The Ayurvedic Pharmacopoeia of India recommends stem bark in haemorrhagic diseases.

The fruit contains beta-amyrin, oleanolic acid and amino acids—glycine, cystine, serine, alanine and leucine; polysaccharides are also present.

Aerial parts gave lignoceric acid, 24-methylenecycloartanone, stigmast-4-en-3-one, beta-sitosterol and its glucoside.

Dosage ► Stem bark—5–10 g powder for decoction (*API,* Vol. II); 1–3 g powder (*API,* Vol. III).

Stachys palustris Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Kashmir, grows in damp places, at altitudes of 1,500–1,800 m.

English ► Marsh, Woundwort (purple-flowered), Allheal. (In Western herbal, Allheal is equated with *Prunella vulgaris.*)

Action ► Haemostatic, sedative, antiseptic, antispasmodic, vulnerary. Used for haemorrhages, gout, cramp, vertigo; applied as poultice to wounds.

The herb contains iridoids, harpagide and acetyl harpagide; flavonoids based on isoscutellarein and oroxylin A.

Stachys sylvatica Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Kashmir.

English ► Hedge Woundwort (reddish-purple-flowered).

Action ► See *S. palustris.*

The plant contains the alkaloids betonicine, turicine, stachydrine and trigonelline. Alcoholic and aqueous extracts of the plant cause contraction of isolated uteri of various animals. Betonicine has been shown to be haemostatic.

An allied species, *S. officinalis,* known as Betony in Europe, is an ageold headache remedy. It contains alkaloids (including stachydrine and betonicine), also saponins and tannins. The plant is mildly sedative and relieves nervous tension.

Stachytarpheta jamaicensis Vahl.

Synonym ► *S. indica* C. B. Clarke.

Family ► *Verbenaceae.*

Habitat ► Cultivated in gardens.

English ► Brazilian Tea, Bastard Vervain, Aaron's Rod.

Ayurvedic ► Kariyartharani.

Siddha/Tamil ► Simainayuruvi, Simainaivirunji, Naioringi.

Folk ► Chirchiti, Marang Chirchiti.

Action ► Febrifuge, anti-inflammatory. In Brazil, the plant is externally used for purulent ulcers and internally for rheumatic

inflammations and fever. An infusion of the bark is used against diarrhoea and dysentery.

The leaves contain friedelin, stigmasterol, ursolic acid, hispidulin, scutellarein, choline, phenolic acids, chlorogenic acid and flavonoids—6-hydroxyluteolol-7-glucuronide, luteolol-7-glucuronide and apigenol-7-glucuronide. Stems and leaves gave an iridoid glycoside, tarphetalin (ipolamiide). The leaves are reported to be used for colds and cough.

Stellaria aquatica (L.) Scop.

Family ► *Caryophyllaceae.*

Habitat ► Temperate Himalayas from Kashmir to Uttar Pradesh at 1,200–2,400 m.

English ► Chickweed, Water Starwort.

Folk ► Budeolaa.

Action ► Leaves—decoction used in galactorrhoea.

Fresh plant contains an essential oil having 3-hydroxymethylfuran, alpha-pinene, limonene, *n*-hexanol, geraniol, camphor, benzyl alcohol, guaiacol, cresol, eugenol and carvacrol as the major constituents.

Stellaria media (Linn.) Vill.

Synonym ► *Alsine media* Linn.

Family ► *Caryophyllaceae.*

Habitat ► Throughout India at 600–1,650 m.

English ► Common Chickweed.

Folk ► Kokoon (Jammu); Safed Fulki, Buchbuchaa (Delhi).

Action ► Antirheumatic, anti-inflammatory, astringent, refrigerant, demulcent, emollient, vulnerary, antipruritic. Dispels excessive body heat, relieves irritation. Used internally for rheumatism, externally in the form of ointment for chronic skin conditions, varicose ulcers and abscesses. Applied as a plaster for broken bones and swellings.

The plant contains saponin glycosides, coumarins, flavonoids (including rutin), carboxylic acid. The leaves contain vitamin C and carotene.

The plant also contains mucilage and is rich in potassium and silicon. The aerial parts, in post-flowering period, contain 44 mg/100 g of vitamn E.

Stephania glabra Miers.

Family ► *Menispermaceae.*

Habitat ► Himalayas from Simla to Sikkim, Khasi Hills and Assam.

Ayurvedic ► Used as Paathaa (*Cissampelos pareira*).

Folk ► Gidaangu (Garhwal), Paahraa (Dehradun).

Action ► Tubers—used in pulmonary diseases, asthma, intestinal, disorders and hyperglycaemia.

Alkaloid palmitine exhibits antibiotic activity; stepharine anti-cholinesterase, cycleanine anti-inflammatory

and hyndarine sedative activity. Tetrahydropalmatine produces sedative and anticonvulsant effects on animals (similar but weaker to that of chloropromazine). Alkaloids from rhizomes—hypotensive. Pronuciferine hydrochloride—spasmolytic. Root—hypoglycaemic, spasmolytic, CNS active, antimicrobial.

Stephania hernandiifolia Walp.

Synonym ► *S. japonica* Miers. *S. sotunda* Hook. f. & Thorns.

Family ► *Menispermaceae.*

Habitat ► Forests of the Western and Eastern Ghats.

Ayurvedic ► Used as Raaj-Paathaa in the South. (Raaj-Paathaa is also equated with *Cyclea arnotii* Miers in southern and eastern parts of India).

Action ► Root—prescribed in skin diseases, pruritus, inflamed piles, internal abscesses, urinary diseases, vomiting, diarrhoea, colic, respiratory disorders and as a cardiotonic.

The plant is rich in alkaloids. Aerial parts gave *epi*-stephanine (aknadine), hernandifoline, aknadinine and magnoflorine. Alkaloid aknadine shows significant antispasmodic activity on uterine spasms. Cytotoxic alkaloids include *d*-and *dl*-tetrandrine, *d-iso*-chondrodendrine and fangchinoline. The alkaloid, *epi*-stephanine (aknadine) possesses adrenergic neuron blocking activity.

Sterculia foetida Linn.

Family ► *Sterculiaceae.*

Habitat ► South India, also cultivated on roadsides.

Habitat ► The West Coast from Konkan southwards.

Siddha/Tamil ► Pinari, Kudirai Pidukku.

Folk ► Jangali Baadaam (in no way related to *Prunus amygdalus*).

Action ► Bark and leaf—aperient, diuretic. Fruit—astringent. Seed oil—carminative, laxative. Wood—antirheumatic. The wood, boiled with seed oil, is used externally in rheumatism.

Beans, called Java Olives, if taken in large quantities, cause nausea, act as violent purgative.

The leaves gave glucuronyl derivatives of procyanidin, scutellarein and luteolin; also taraxerol, *n*-otacosanol and beta-sitosterol. Lupenone, lupeol and betulin were obtained from the heartwood. Seed and root lipid contained cyclopropene fatty acids. Sterculic and malvalic acids show carcinogenic and co-carcinogenic activities.

Leucoanthoyanidin-3-O-alpha-L-rhamnopyranoside and quercetin rhamnoside have been isolated from the root.

Sterculia urens Roxb.

Family ► *Sterculiaceae.*

Habitat ► Rajasthan, Assam, Bihar, Uttar Pradesh, Madhya Pradesh, southwards to Western Peninsula.

English ► Karaya Gum.

Unani ► Gond Kateeraa (the authentic source is *Cochlospermum religiosum*).

Siddha/Tamil ► Kavalam.

Folk ► Karai, Kandol (Maharashtra, Gujarat).

Action ► Gum used as a substitute for tragacanth in throat affections.

The gum and mucilage contain aldobiuronic and aldotriouronic acids.

The roots contains a coumarin, scopoletin.

The leaves afforded flavonol glycosides, quercetin and kaempferol derivatives; beta-amyrin, its acetyl derivative, beta-sitosterol and an ester of terephthalic acid. Stercurensin, a C-methylchalcone, has been isolated from the leaves.

The gum of *Sterculia villosa* Roxb. (Udall Wood) resembles with that of *S. urens.* Diometin and chrysoeriol and their 7-O-glucosides were isolated from the wood.

S

Stereospermum personatum (Hassk.) D. Chatterjee.

Synonym ► *S. Chelonoides* (Linn. f.) DC. (now S. Colais).
S. tetragonum A. DC.

Family ► *Bignoniaceae.*

Habitat ► Throughout India, especially in the moist regions.

English ► Trumpet Flower, Yellow Snake tree.

Ayurvedic ► Paatalaa, Paatali, Paatalai, Krishna-vrantaa, Madhu-duuti, Kaama-duuti, Ativallabhaa, Taamrapushpi, Kuberaakshi. Amoghaa, Kumbhipushpi, Ambuvaasini. Copper-red-flowered var., known as Taamrapushpi, is equated with *S. suaveolens* (Paatalaa) and the white-flowered one with *S. chelenoides.* (Paatalai).

Siddha/Tamil ► Paadiri.

Action ► *The Ayurvedic Pharmacopoeia of India* recommends the root of Paatalaa in lipid disorders; the stem bark in oedema and retention of urine.

The white-flowered var. purifies blood, increases appetite and is prescribed for vomiting, hiccough, thirst, oedema and inflammatory chest diseases.

The copper-red-flowered var. is prescribed in difficult breathing, vomiting, oedema, flatus and high fever.

Ethanolic extract of the plant showed hypoglycaemic and anticancer activity experimentally.

A decoction of *S. personatum* root is prescribed for asthma and cough; of the leaves in chronic dyspepsia. A decoction of the root and leaves is credited with antipyretic properties. The bark exhibited antibacterial and antitubercular properties.

A decoction of *S. suaveolens* roots is prescribed for intermittent and puerperal fevers, inflammatory affections of the chest. Extracts of the plant contain lapachol.

The leaves of *S. chelonoides* contain a flavone, stereolensin. The bark gave an iridoid glycoside; the root bark gave *n*-triacontanol and beta-sitosterol; the root heartwood gave la-

pachol, dehydro-alpha-lapachone and dehydrotectol. Ceryl alcohol, palmitic, stearic and oleic acids were isolated from the root. Lapachol exhibited cytotoxic activity.

Dosage ► Stem bark (white-flowered var.)—3–6 g powder. (*API,* Vol. IV.) Root (red-flowered var.)—5–10 g powder. (*API,* Vol. III.)

Streblus asper Lour.

Synonym ► *Epicarpurus orientalis* Bl.

Family ► *Moraceae.*

Habitat ► Drier parts of Peninsular India.

English ► Siamee Rough Brush.

Ayurvedic ► Shaakhotaka, Shaakhota, Pitaphalaka. Bhuutavaasa, Kharachhada.

Siddha/Tamil ► Piraayan, Pirai.

Folk ► Sihor.

Action ► Stem bark—febrifuge, antidiarrhoeal. Root—applied on inflamed swellings and syphilitic eruptions. Latex—applied on glandular swellings and elephantiasis.

The Ayurvedic Pharmacopoeia of India recommends the use of the stem bark in cervical lymphadenitis, also in lipid disorders.

The root bark contained cardenolide glycosides, including asperoside and strebloside; also yielded 6-deoxyallose. Stem bark yielded alpha-amyrin acetate, lupeol acetate, lupeol and beta-sitosterol.

Asperoside and strebloside exhibited antifilarial activity, former being more effective. Crude extract is used for filaria.

The Central Drug Research Institute, Lucknow, has developed an antifilarial drug from the crude extract of stem. The stem bark is reported to cure filarial lymphangitis, lymphoedema, chyluria caused by filariasis.

Dosage ► Stem bark—1–3 g powder. (*API,* Vol. III.)

Striga asiatica (Linn.) Kuntze.

Synonym ► *S. lutea* Lour.

Family ► *Scrophulariaceae.*

Habitat ► Throughout the country and in the rainfed rice fields of Kerala.

Ayurvedic ► Agnivrksha, Kuranti.

Siddha/Tamil ► Pallipundu.

Folk ► Agiyaa.

Action ► Improves appetite and taste. Prescribed in strangury and diseases due to vitiated blood.

Striga gesneroides Vatke.

Synonym ► *S. orobanchioides* Benth.

Family ► *Scrophulariaceae.*

Habitat ► Western Peninsular India.

Folk ► Laal-giyaa.

Action ► Used in diabetes (in folk medicine). Hypoglycaemic activity, not confirmed.

Strobilanthes callosus Nees.

Synonym ► *Carvia callosa* (Nees) Bremek.

Family ► *Acanthaceae.*

Folk ► Maruaa-daanaa, Kaarvi (Maharashtra).

Action ► Bark—used in external applications for parotitis. Flowers—vulnerary. Leaves are poisonous.

Roots contain lupeol; the seeds are reported to contain brucine.

Strobilanthes flaccidifolius Nees.

Synonym ► *S. cusia* (Nees) Imlay.

Family ► *Acanthaceae.*

Habitat ► Assam, Meghalaya, West Bengal and Manipur.

English ► Assam Indigo.

Folk ► Ruum, Raampat (Assam); Khumaa (Manipur).

Action ► Leaves—astringent, diuretic and lithotriptic.

The indican content of the leaves has been reported to be 0.4–1.3%. Lupeol, betulin, lupenone, indigo, indirubin, a quinazolinone and a quinazolinedione have been isolated.

Strophanthus kombe Oliver.

Family ► *Apocynaceae.*

Habitat ► Native to tropical East Africa; runs wild at some places in West Bengal.

English ► Strophanthus.

Action ► Dry ripe seeds—cardiac glycosides (the mixture is known as Strophanthin-K) act like digitalis but are poorly absorbed from the digestive tract, are given by injection.

Strophanthus wightianus Wall. ex Wight, known as Nerivalli (Tamil) and Kambetti (Malyalam), is found along with western coast of Kerala.

The plant yields 2.1% of glycosides. The glycosides are known as caulo-side and divaricoside, the corresponding genins are caudogenin and sarmentogenin; the latter a precursor of cortisone. Studies have indicated that the tinctures prepared from the seeds compare favourably with those from the seeds of *S. kombe.*

Strychnos colubrina Linn.

Family ► *Lognaniaceae; Strychnaceae.*

Habitat ► Deccan Peninsula from Konkan to Cochin.

Ayurvedic ► Kupilu-lataa, Kuchilaa-lataa.

Folk ► Kaajar-vel (Maharashtra).

Action ► Leaves and roots are boiled in oil and applied to rheumatic swellings. Wood—used for malarial fever and cutaneous eruptions. Root—purgative, febrifugal, anthelmintic.

The roots, wood, bark and seeds contain alkaloids (bark 5.54%, wood 0.96%), consisting of brucine and strychnine. Beta-sitosterol has been reported in the plant.

Strychnos ignatii Bergius.

Family ► *Loganiaceae; Strychnaceae.*

Habitat ► Native to the Philippines. Seeds are imported into India.

English ► Ignatus Beans.

Unani ► Papitaa Vilaayati. (Papitaa Desi is equated with *Carica papaya* Linn.)

Siddha/Tamil ► Kayappankottai.

Action ► Properties similar to those of Nux vomica. Used as a stimulant and nervine tonic, also for asthma and rheumatism.

The seeds contain indole alkaloids; brucine and its N-oxide, alpha-and beta-colubrine, diaboline, icajine, novacine, strychnine and its N-oxide, and 12-hydroxyderivatives, vomicine, and others. Share of strychnine is 45–60%, in indole alkaloids (2.5–5.6%).

Strychnos nux-vomica Linn.

Family ► *Loganiaceae; Strychnaceae.*

Habitat ► Tropical India up to an altitude of 360 m.

English ► Nux vomica.

Ayurvedic ► Kapilu, Kaakatinduka, Kaakendu, Kaakapiluka, Vishamushtikaa, Vishamushti, Vishatinduka, Kuchilaa, Ksuchalaa.

Unani ► Azaraaqi, Kuchlaa.

Siddha ► Yettikkottai.

Action ► Nervine tonic and a potent CNS stimulant.

Seeds—used in emotional disorders, insomnia, hysteria, epilepsy, paralytic and neurological affections, retention or nocturnal incontinence of urine, spermatorrhoea, sexual debility and impotence, general exhaustion; as antidote to alcoholism; GIT disorders. Bark—juice given in acute dysentery, diarrhoea and colic. Root—given in intermittent fevers. In Chinese medicine a paste made of Nux vomica seeds is applied topically for treating facial paralysis.

Included among unapproved herbs by *German Commission E.*

The Ayurvedic Pharmacopoeia of India recommends detoxified seeds in paralysis, facial paralysis, sciatica and impotency.

The seeds contain indole alkaloids, the major one is strychnine (approx. 50% of the alkaloids); others include strychnine N-oxide, brucine and its N-oxide, alpha-and beta-colubrine, condylocarpine, diaboline, geissoschizine, icajine, isostrychnine, normacusine, novacine, pseudobrucine, pseudo-alpha-colubrine, pseudo-beta-colubrine, pseudostrychnine and vomicine (3-hydro-beta-colubrine). Loganin is also present. Pseudostrychnine is non-toxic. The alkaloidal content of the seeds ranges from 1.8 to 5.3%.

The leaves contain strychnine and brucine (together 1.6%), strychnine 0.025%; vomicine is the major constituent of leaves. The bark contains 9.9% total alkaloids (brucine 8%, strychnine 1.58%); pseudostrychnine, pseudobrucine and beta-colubrine in small amounts. The roots contain 0.99% alkaloids (brucine 0.28%, strychnine 0.71%).

Strychnine, when tested for antiulcer activity in shay rat model at a dose of 0.25 mg/kg body weight, complete absence of ulceration was observed which was comparable to cimetidine. Exhausted Nux-vomica powder at a dose of 20 mg/kg body weight, and brucine at a dose of 0.25 mg/kg body weight gave protection similar to strychnine.

Orally, 30–50 mg Nux-vomica (5 mg strychnine) is toxic.

Dosage ► Detoxified seed—60–125 mg. (*API*, Vol. IV.)

Strychnos potatorum Linn.f.

Family ► *Loganiaceae; Strychnaceae.*

Habitat ► Forests of West Bengal, Central and South India, up to 1,200 m.

English ► Clearing Nut tree.

Ayurvedic ► Kataka, Katakaphala, Payah-prasaadi, Chakshushya, Nirmali.

Unani ► Nirmali.

Siddha/Tamil ► Thettran, Thetrankottai.

Action ► Seed—antidiabetic, antidysenteric, emetic.

Mannogalactan from seeds reduces cholesterol and triglycerides (one-tenth and one-fifth when compared to clofibrate). Seeds are also applied to abscesses, and venereal sores (internally in gonorrhoea). Fruits—antidiabetic; antidysenteric, expectorant. (Pulp is used as a substitute for ipecacuanha.)

The Ayurvedic Pharmacopoeia of India recommends the seed in dysuria, polyuria, urolithiasis, also in epilepsy.

The seeds, leaves and trunk bark gave diabolin (major alkaloid) and acetyldiabolin. Seeds also gave brucine, strychnine, novacine, icajine, oleanolic acid and its glycoside. Leaves and bark gave isomotiol, stigmasterol, campesterol and sitosterol. Diabolin exhibits hypotensive activity.

A decoction of seeds is given to treat stammering.

The seeds resemble those of Nux-vomica but are non-poisonous. The ripe seeds are used for clearing muddy water.

Dosage ► Seed—3–6 g. (*API*, Vol. IV.)

Strychnos rheedei C.B.Clarke.

Synonym ► *S. cinnamomifolia* Thw. *S. wallichiana* Steud.

Family ► *Loganiaceae; Strychnaceae.*

Habitat ► Western Ghats, from South Kanara to Trivandrum, up to 900 m and in Andhra Pradesh.

Siddha/Tamil ► Valli Kanjiram.

Action ► Roots—antirheumatic, anti-inflammatory, febrifuge. Used for neurological affections, elephantiasis and muscular pains.

Indole type alkaloids have been reported from the plant.

S

Styrax benzoin Dry.

Family ► *Styraceae.*

Habitat ► Native to South-East Asia and East Indies.

English ► True Gum Benzoin, Sumatra Benzoin or Gum Benjamin.

Unani ► Lobaan.

Siddha/Tamil ► Saambiraani.

Action ► Gum—antiseptic, astringent, anti-inflammatory, expectorant (used for cough and respiratory tract catarrh). Used as genitourinary antiseptic, as a mouthwash in stomatitis, topically on wound and ulcers, as an inhalation in colds, coughs and bronchitis. Lipophilic fraction stimulates phagocytosis.

The gum contains mainly cinnamic, benzoic and sumaresinolic acid esters, benzaldehyde and vanillin.

Styrax officinale Linn.

Family ► *Styracaceae.*

Habitat ► A native to Asia minor and Syria.

English ► The True Storax tree.

Ayurvedic ► Silhaka, Silaarasa, Turushka, Kapitaila, Yavandeshaja.

Folk ► Silaajit, Usturak.

Action ► Balsam is used for cough and respiratory tract catarrh. Turushka was obtained from *Styrax officinale.* Due to scarcity, it was replaced by the exudation of *Liquidamber orientalis* Mill. Balsam obtained from *Altingia excelsa* Noronha is used as a substitute for Silhaka and is known as Silaarasa (occurs in Assam and Arunachal Pradesh).

Dosage ► Balsam—500 mg to 1.0 g. (*CCRAS.*)

Sutherlandia frutescens R.Br.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Native to South Africa; cultivated in Indian gardens.

English ► Bladdersenna, Cancerwort, Cape Baloon Pea.

Action ► Leaves—infusion or decoction given in stomach and intestinal disorders and hepatic affections. Much milder in action than true Senna.

Swertia affinis C. B. Clarke.

Synonym ► *S. angustifolia* Buch.-Ham ex. D. Don var. *pulchella* Burkill.

Family ► *Gentianaceae.*

Habitat ► Sub-tropical Himalaya from Himachal Pradesh to Bhutan, the Khasi and Lushai Hills, Manipur at 300–1,800 m. Bihar and Peninsular India up to 1,800 m.

Ayurvedic ► Kiraatatikta (related species).

Action ► Febrifuge and bitter tonic.

Swertia angustifolia Buch.-Ham ex D. Don.

Family ► *Gentianaceae.*

Habitat ► Sub-tropical Himalaya from Kashmir to Bhutan.

Ayurvedic ► Kiraata (sweet var.).

Folk ► Pahaari Kiretta, Mithaa (sweet) Kiryaat.

Action ► Used as a substitute for *S. chirayita*. (Inferior in bitter tonic properties.)

Aerial parts gave ursolic acid, xanthones and beta-sitosterol. Several tetra-and pentaoxygenated xanthones have been isolated from the plant.

Swertia chirayita (Roxb. ex Flem.) Karst.

Synonym ► *S. chirata* (Wall.) C. B. Clarke.
S. tongluensis Burkill.
Gentiana chirayita Roxb. ex Flem.
G. chirata Wall.
Ophelia chirata Griseb.

Family ► Gentianaceae.

Habitat ► Temperate Himalayas from Kashmir to Bhutan and in Khasi Hills.

English ► Chiretta.

Ayurvedic ► Kiraata, Kairaata, Kiraataka, Kandatikta, Kiraatatikta, Kiraatatiktaka, Katutikta, Trinnimba, Bhuunimba, Aranyatikta, Raamasenaka. Bhuunimba (also equated with *Andrographis paniculata*).

Unani ► Chiraitaa.

Siddha ► Nilavembu.

Action ► Blood purifier and bitter tonic (*The Ayurvedic Pharmacopoeia of India*); used in skin diseases. Other properties: anti-inflammatory (experimentally, the benzene extract was comparable with phenylbutazone and betamethasone in induced arthritis); hypoglycaemic (xanthone, swerchirin, lowers blood sugar), astringent, stomachic (in dyspepsia and diarrhoea); antimalarial (before the discovery of Peruvian bark), anthelmintic; antiasthmatic, bechic; and as a liver tonic (several active principles are hepatoprotective).

The herb contains oxygenated xanthone derivatives, including decussatin, mangiferin, swerchirin, swertianin, isobellidifolin; iridoids including chiratin, alkaloids including gentianine, gentiocrucine, enicoflavine and glycosyl flavones.

Antitubercular activity has been claimed in xanthones. (*Natural Medicines Comprehensive Database,* 2007.)

Green chiretta is equated with *Andrographis paniculata* Nees, *Acanthaceae.*

Dosage ► Whole plant—1–3 g powder; 20–30 g for decoction. (*API,* Vol. I.)

Swertia ciliata (D. Don) Burtt.

Synonym ► *S. purpurascens* Wall. ex C. B. Clarke.

Family ► *Gentianaceae.*

Habitat ► From Konkan to Kerala at 1,500–2,000 m.

Ayurvedic ► Shailaja, Kiraatatikta (related species).

Action ► A substitute for *S. chirayita*. The whole plant contains a number of tetraoxygenated and pentaoxygenated xanthones.

Swertia densifolia (Griseb.) Kashyapa.

Synonym ► *S. decussata* Nimmo ex Grah.
Ophelia multiflora Dalz.

Family ► *Gentianaceae.*

Habitat ► From Konkan to Kerala at 1,500–2,000 m.

Ayurvedic ► Shailaja, Kiraatatikta (related species).

Action ► A substitute for *S. chirayita* and *Gentiana lutea* L.

The leaves and flowers contain xanthone—swartinin, triterpenes, oleanolic acid and beta-sitosterol. Decussatin is also present in the flowers and root.

Swertia lawii Burkill.

Synonym ► *S. corymbosa* var. *lawii* C. B. Clarke.

Family ► *Gentianaceae.*

Habitat ► Western Ghats from Maharashtra to South Kanara at 1,200 m.

Ayurvedic ► Kiraatatikta (related species).

Action ► Used as a substitute for *Swertia chirayita*.

Whole plant gave a number of xanthones. Erythrocentaurin has also been reported from the plant.

Swertia paniculata Wall.

Synonym ► *Ophelia paniculata* (Wall.) D. Don
O. wallichii G. Don

Family ► *Gentianaceae.*

Habitat ► The Himalaya from Kashmir to Bhutan and in Lushai Hills in Mizoram at 1,500–2,400 m.

Action ► Used as a substitute for *Swertia chirayita*.

The root gave xanthones (including swerchirin and bellidifolin); flavone-C-glycosides—swertisin and homoorientin. The plant gave polyoxygenated xanthones and xanthone-O-glucosides; also a pentacyclic triterpenehederagenin. Aerial parts, in addition to xanthones, contain ursolic acid.

Swietenia mahagoni Jacq.

Family ► *Symphoremataceae.*

Habitat ► Native to Central America; cultivated in South India.

English ► West Indian Mahogany.

Siddha/Tamil ► Ciminukku.

Folk ► Mahaagani.

Action ► Bark—astringent and antipyretic. Used as a substitute for cinchona bark is the West Indies. The bark contains 15% tannin, the wood 6%.

The seeds have been reported to contain a bitter substance; mahoganin, 7-deactyl-7-oxogedunin, cyclomahogenol and 6-hydroxymethyl angolensate are also present.

S

Tetranortriterpenoids have been isolated from cotyledons and seeds. The ether extract of the leaves inhibits platelet activity factor (PAF)-induced platelet aggregation.

Symphorema involucratum Roxb.

Family ► *Symphoremataceae.*

Habitat ► Indo-Malayasian region. Found in Deccan Peninsula, ascending to 1,200 m, and in Bihar, Orissa, Madhya Pradesh and Nagaland.

Folk ► Surudu, Konatekkali, Gubbadaara (Telugu).

Action ► Quercetin, isolated from fresh water flowers, exhibited anti-inflammatory activity experimentally, comparable to that of phenylbutazone.

S

Symphytum officinale Linn.

Family ► *Boraginaceae.*

Habitat ► Europe and from the Mediterranean to Caucasian region. Russian Comfrey or Blue Comfrey has been introduced in Simla; Prickly Camfrey is cultivated in Western India.

English ► Comfrey, Knitbone.

Folk ► Sankuutan (Maharashtra).

Action ► Vulnerary (*The British Herbal Pharmacopoeia*), astringent, demulcent, haemostatic, tissue-restorative (repairs broken bones and lacerated flesh, promotes formation of a callus).

Key application ► Externally for fractures and sprains, to promote bone growth and formation of callus. (*German Commission E.*)

Allantoin, a cell proliferant, helps repair damaged tissues. Anti-inflammatory action is due to rosmarinic acid and other phenolic acids. Used for stomach ulcers, irritable bowel syndrome, colitis, hiatus hernia; pleurisy, bronchitis (contraindicated in oedematous conditions of the lung); and for the treatment of fractures, sickets, varicose ulcers. Experiments, during the 1960s, reveal that pyrrolizidine alkaloids are toxic to liver (dispute still unresolved); it is still not clear if these are hepatotoxic in the context of the whole plant. The aerial parts are considered safe.

Russian Comfrey or Blue Comfrey has been equated with *Symphytum peregrinum* Ledeb. (introduced into India in Simla).

The Plant is a good source of allantoin, a drug used in the treatment of gastric ulcers, disorders of liver and cancer. Tincture of the fresh herb is reported to be used for asthma, bronchitis and congestive conditions of the lungs.

Symplocos paniculata (Thunb.) Miq.

Synonym ► *S. crataegoides* Buch.-Ham. ex Don.
S. chinensis (Lour.) Druce.
Prunus paniculatus Thunb.

Family ► *Symplocaceae.*

Habitat ► The Himalayas from Kashmir to Arunachal Pradesh and Assam; Khasi Hills at 1,000–2,500 m.

English ► Sapphire Berry.

Ayurvedic ► Lodhra-Pattikaa.

Unani ► Lodh Pathaani.

Action ► Leaf—spasmolytic, antiviral, antiprotozoal, anthelmintic. Bark—used as a tonic for preventing abortion. Other uses same as of *S. racemosa.*

The water-soluble fraction from the bark has been reported to exhibit anti-oxytocic activity. Ethanolic extract of the leaves showed activity against *Entamoeba histolytica* strain *STA, Ascaridia galli* and *Ranikhet-disease virus.* It also affected blood pressure in dogs and cats, and showed activity on the ileum of guinea-pigs. The extract of stem also affected the blood pressure.

The leaf and stem are CVS active.

Symplocos racemosa Roxb.

Synonym ► *S. beddomei* C. B. Clarke
S. candolleana Brand.

Family ► *Symplocaceae.*

Habitat ► Throughout North and eastern India, extending southwards to Peninsular India.

English ► Lodh tree, Sapphire Berry.

Ayurvedic ► Lodhra, Rodhra, Shaavara., Sthulavalkal, Trita, Pattikaa Lodhra, Shaabara Lodhra.

Unani ► Lodh Pathaani.

Siddha/Tamil ► Vellilethi, Vellilothram.

Action ► Bark—used as specific remedy for uterine complaints, vaginal diseases and menstrual disorders; menorrhagia, leucorrhoea (*The Ayurvedic Pharmacopoeia of India*); also used in diarrhoea, dysentery, vaginal ulcers, inflammatory affections and liver disorders.

The bark gave colloturine, harman (loturine) and loturidine. Stem bark gave proanthocyanidin-3-monoglucofuranosides of 7-O-methyl-and 4'-O-methyl-leucopelargonidin. Betulinic, oleanolic, acetyl oleanolic and ellagic acids are reported from the plant.

Glycosides, isolated from the ethanolic extract of the stem bark, are highly astringent and are reported to be responsible for the medicinal properties of the bark.

The bark extracts have been reported to reduce the frequency and intensity of the contractions *in vitro* of both pregnant and non-pregnant uteri of animals. A fraction from the bark, besides showing action on uteri, was spasmogenic on various parts of the gastrointestinal tract and could be antagonized by atropine.

The bark extracts were found to inhibit the growth of *E. coli, Micrococcus pyogenes* var. *aureus,* and enteric and dysenteric groups of organisms.

Dosage ► Stem bark—3–5 g powder; 20–30 g for decoction. (*API,* Vol. I.)

S. laurina Wall., synonym *S. spicata* Roxb. (North and East Idia, Western and Eastern Ghats); *S. ramosissima* Wall. (the temperate Himalayas from Garhwal to Bhutan); *S. sumuntia* Buch.-Ham. (Nepal to Bhutan) are also equated with Lodhra.

The powdered bark is used in folk medicine for biliousness, haemorrhages, diarrhoea, dysentery and genitourinary diseases.

Symplocos theaefolia Buch-Ham. ex D. Don (the Eastern Himalayas from Nepal to Bhutan and in the Khasi Hills at altitudes between 1,200 and 2,500 m) is known as Kharanl in Nepal and Dieng-pei or Dieng-twe-pe in khasi.

The ethanolic extract of leaves showed hypoglycaemic activity in rats and anticancer activity against Friend-virus-leukaemia (solid) in mice. The extract of the leaves and of stems showed activity against human epidermoid carcinoma of the nasopharynx in tissue-culture.

The Wealth of India equated *S. laurina* with Lodh Bholica (Bengal) and *S. sumuntia* with Pathaani Lodh.

The wood of *Symplocos phyllocalyx* C. B. Clarke is known as Chandan and Laal-chandan. It should not be confused with *Santalum album* or *Pterocarpus santalinus.*

S

Syringa vulgaris Linn.

Family ► *Oleaceae.*

Habitat ► Cultivated in gardens in the hills.

English ► Common Lilac.

Action ► Bark, leaves and capsules—used as antipyretic, especially in chronic malaria, and as vermifuge. Leaf extract—antipyretic.

The leaves, flowers and bark contain the glucoside, syringin and syringopicrin. Syringin is also present in the roots and fruits; mannitol has been reported in leaves, bark and fruits. The leaves contain 131.6 mg/100 g of vitamin C. Ursolic acid has also been reported in the plant.

Syzygium aromaticum (Linn.) Merr. & Perry.

Synonym ► *Eugenia aromatica* Kuntze.
Eugenia caryophyllata Thunb.
Caryophyllus aromaticus Linn.

Family ► *Myrtaceae.*

Habitat ► Cultivated in Tamil Nadu and Kerala.

English ► Clove.

Ayurvedic ► Lavanga, Devakusum, Devapushpa, Shrisangya, Shriprasuunaka.

Unani ► Qaranful, Laung.

Siddha/Tamil ► Kiraambu, Lavangam.

Action ► Carminative, anti-inflammatory, antibacterial. Flower buds—antiemetic, stimulant, carminative. Used in dyspepsia, gastric irritation. Oil—employed as a local analgesic for hypersensitive dentlines and carious cavaties; internally as a carminative and antispasmodic.

Key application ► In inflammatory changes of oral and pharyngeal mucosa; in dentistry; for topical anesthesia. (*German Commission E.*)

Eugenin, triterpene acids, crategolic acid and steroid glucosides afford anti-inflammatory and antiseptic proper-

ties to the buds. Eugenol, a major component of the oil, is antibacterial. Acetone extract of clove, eugenol and acetyleugenol possess cholagogue activity. The eugenol and acetyleugenol components of the clove oil inhibit arachidonate-, adrenalin- and collagen-induced platelet aggregation.

Clove terpenes show significant activity as inducers of detoxifying enzyme, glutathione-S-transferase (GST) in mouse liver and intestine and bring about carcinogen detoxification.

Whole cloves might have chemoprotective activity against liver and bone marrow toxicity. (*The Review of Natural Products* by Facts and Comparisons, 1999.)

Dosage ► Dried flower-bud—0.5–2.0 g powder. (*API*, Vol. I.)

Syzygium cerasoideum (Roxb.) Chatterjee & Kanjilal f.

Synonym ► *S. nervosum* DC.
S. operculatum Niedenz.
Eugenia operculata Roxb.

Family ► *Myrtaceae.*

Habitat ► Uttar Pradesh, Bihar, Orissa and Assam up to 600 m and in the Western Ghats up to 900 m.

Ayurvedic ► Bhumi Jambu.

Folk ► Rai Jaamun, Dugdugiaa; Topaakudaa (Bihar), Peeta-jaam (Orissa).

Action ► Fruit—antirheumatic. Aerial parat—hypoglycaemic.

Root—rubefacient. Bark—bitter, astringent; given in dysentery, biliousness and bronchitis. A concentrate of the root infusion is applied and rubbed over painful joints. Aerial parts exhibit hypoglycaemic activity.

Syzygium cuminii (Linn.) Skeels.

Synonym ► *S. jambolanum* (Lam.) DC.
Eugenia jambolana Lam.

Family ► *Myrtaceae.*

Habitat ► Cultivated throughout India up to 1,800 m.

English ► Java Plum, Jambolan, Black Plum.

Ayurvedic ► Jambu, Mahaaphalaa, Phalendraa, Surabhipatra. (Fruit—black.)

Unani ► Jaamun

Siddha/Tamil ► Naaval.

Action ► Fruit—stomachic, carminative, diuretic. Bark and seed—antidiarrhoeal. Seed—hypoglycaemic. Leaf—antibacterial, antidysenteric.

Key application ► Bark—in non-specific acute diarrhoea and in topical therapy for mild inflammation of the oral-pharyngeal mucosa; externally in mild, superficial inflammation of the skin. (*German Commission E.*) The seed has been included among unapproved herbs by *German Commission E,* as the blood sugar-lowering effect could not be established by several

S

researchers. Claimed applications mentioned in *German Commission E* monograph: in diabetes, also in combination preparations for atonic and spastic constipation, diseases of the pancreas, gastric and pancreatic complaints.

The Ayurvedic Pharmacopoeia of India recommends the bark in acute diarrhoea and haemorrhagic diseases; the seed in hyperglycaemia and polyuria.

The aqueous alcoholic extract of the bark contains bergenin, gallic acid and ethyl gallate.

The fruit contains anthocyanins and yielded citric, malic and gallic acids. Gallic acid and tannins account for astringency of the fruit. Malic acid is the major acid (0.59%) of the weight of fruit; a small quantity of oxalic acid is reported to be present. Glucose and fructose are principal sugars in the ripe fruit; surcose was not detected.

The seeds contain tannin (about 19%), ellagic acid, gallic acid (1–2%), beta-sitosterol, 0.05% essential oil; myricyl alcohol is present in the unsaponifiable matter.

The stem bark yielded friedelan-3-alpha-ol, kaempferol, quercetin, beta-sitosterol and its glycoside, kaempferol-3-O-glucoside, gallic acid, friedelin and betulinic acid. It contained eugenin and epi-friedelanol. 10–12% tannins were reported.

The leaves contain aliphatic alcohols, sitosterols, betulinic acid and crategolic (maslinic) acid.

The flowers contain triterpenic acids—oleanolic acid and crategolic acid. The oleanolic acid is a strong protector against adriamycin-induced lipid peroxidation in liver and heart microsomes.

Phenols, including methylxanthoxylin and 2, 6-dihydroxy-4-methoxyacetophene have been isolated from the plant (also from the seed).

Seeds in a dose of 10 mg/kg *p.o.* on normal and alloxanized rabbits exhibited hypoglycaemic activity up to 23 and 20% respectively. The chloroform fraction of seed extract exhibited potent anti-inflammatory action against both exudative and proliferative and chronic phases of inflammation, besides exhibiting significant anti-arthritic, antipyretic and analgesic activities. Water extract exhibited antibacterial property against *S. boydi* and *S. dysentrae* in cases of dysentery and diarrhoea.

The bark extract is reported to have an effect on glycogenolysis and glycogen storage in animals.

Dosage ► Stem bark—10–20 g for decoction; dried seed—3–6 g powder. (*API,* Vol. II.)

Syzygium hemisphericum (Wt.) Alston

Synonym ► *Eugenia hemispherica* Wt.
Jambosa hemispherica (Wt.) Walp.

Family ► *Myrtaceae.*

Habitat ► South India, particularly in the Nilgiri, Palni and Annamalai hills and Western Ghats.

Siddha/Tamil ► Vellai Naval.

Action ► Bark—antibilious; also used for syphilitic affections.

Syzygium jambos (Linn.) Alston.

Synonym ► *Eugenia jambos* Linn. *Jambosa vulgaris* DC.

Family ► *Myrtaceae.*

Habitat ► Cultivated in many parts of India.

English ► Rose Apple.

Ayurvedic ► Raaj-Jambu. (Fruits—pale yellow or pinkish white).

Siddha/Tamil ► Peru Navel.

Folk ► Gulaabjaamun.

Action ► Fruit—used in liver complaints. Bark—astringent, antidiarrhoeal, antidysenteric. Leaves—astringent, anti-inflammatory.

The juice of fresh fruit contains alanine, aspartic acid, cystine or cysteine, glutamine, threonine and tyrosine. The essential oil, obtained from leaves, is a good source of *dl*-alpha-pinene (26–84%) and *l*-limonene (23–84%).

Ethyl acetate and methanolic extract of the leaves are very effective in curing pedal oedema and in acute and chronic swelling; also gave encouraging results in arthritis. Though all extracts (methanolic, hexane, dichloromethane and ethyl acetate) of the leaves exhibit anti-inflammatory activity, a 10% aqueous extract of the leaves is found significantly effective when compared to 80 mg/kg of phenylbutazone.

In Brazil, a decoction of dry leaves is given in diabetes.

Aerial parts exhibit diuretic activity.

Syzygium malaccense (Linn.) Merrill & Perry.

Synonym ► *Eugenia malccensis* Linn.

Family ► *Myrtaceae.*

Habitat ► Cultivated in Bengal and South India, chiefly in gardens.

English ► Malay Apple, Mountain Apple.

Action ► Leaves—dried and powdered, used against stomatitis. Bark—astringent; used for making a mouthwash for thrush.

The extracts of seeds, fruits, leaves, stem and bark show varying degree of antibiotic activity against *Micrococcus pyogenes* var. *aureus.* An extract of fruits (without seeds) is moderately effective against *E. coli* and those of bark and leaves against *Shigella paradys.*

The extracts of the plant, excluding root, affect the rate and amplitude of respiration and also blood pressure.

Syzygium zeylanicum (Linn.) DC.

Synonym ► *Eugenia zeylanica* (L.) Wight.

Family ► *Myrtaceae.*

Habitat ► Maharshtra, Mysore, Kerala, Orissa and Andaman Islands.

Siddha/Tamil ► Marungi.

Folk ► Bhedas (Maharashtra).

Action ► Leaves and roots—vermifuge. Plant—stimulant, antirheumatic. (Berries—white, the size of a pea; edible.)

Among other members of the genus, *S. arnottianum* (Wight) Walp. and *S. caryophyllatum* (Linn.) Alston are distributed in South India, particularly in Western Ghats. The fruits are edible. Stem bark of all the species contain tannin, that of *S. arnottianum* up to 16%.

T

Tabernaemontana coronaria (Jacq.) Willd.

Synonym ► *T. divaricata* (L.) R. Br. *Ervatamia coronaria* (Jacq.) Staph. *E. divaricata* (L.) Burkill.

Family ► *Apocynaceae.*

Habitat ► Sub-Himalayan tract. Cultivated in gardens.

English ► East Indian Rosebay.

Ayurvedic ► Tagar, Nandivriksha (*The Wealth of India*); Nandi Pushpa. (Tagar is equated with *Valeriana hardwickii* and Nandivrksha with *Cedrela toona.*)

Siddha/Tamil ► Nandiyavattam.

Folk ► Tengari, Chaandani.

Action ► Leaves—milky juice, anti-inflammatory; applied to wounds. Flowers—mixed with oil, used in skin diseases. Root—acrid, anodyne; relieves toothache, also used as a vermicide.

Various parts of the plant are used in the indigenous system of medicine for the treatment of skin diseases and cancer. A decoction of leaves is used as antihypertensive and diuretic.

The plant from Sri Lanka (root, leaves and flowers) contain several indole alkaloids including voacristine, voacangine, coronaridine, vobasine, tabernaemontanine and dregamine. Isovoacristic hydrochloride, found in the plant, caused bradycardia in frogs and rabbits. The flowers contain an alkaloid tabersonine which is reported to show hypotensive effect on anaesthetized cats.

Coronaridine showed autonomic as well as CNS activity when tested for biological action in animals. It produced analgesia and was effective in suppressing foot-shock-induced rage in mice.

Indole alkaloid (I) inhibited HCl-induced ulcer in mice by 48.8%.

The crude alkaloid extracts of the leaves, bark and flowers exhibit antibacterial activity against *Staphylococcus aureus.*

Tabernaemontana dichotoma Roxb.

Synonym ► *Ervatamia dichotoma* Blatter. *Rejoua dichotoma* Gamble.

Family ► *Apocynaceae.*

Habitat ► Western Ghats at low elevations.

English ► Eve's Apple, Forbidden Fruit.

Siddha/Tamil ► Kandalaippalai, Kattalari-palai.

Folk ► Tengari (Var.).

Action ► Seed, leaves, bark—purgative. Latex—cathartic.

The fruit gave the alkaloid, coronaridine. Root bark gave alkaloids—heyneanine and voacristine hydroxyindolenine. The petroleum ether-ex-

tractable alkaloids of the fruit showed CNS depressant and hypotensive activities.

Tabernaemontana heyneana Wall., synonym, *Ervatamia heyneana* Cooke is also equated with Tengari of Indian medicine.

The wood and stembark yielded indole alkaloids; ursolic acid, beta-amyrin and beta-amyrin acetate. A number of alkaloids showed cytotoxic activity. (*Phytochemistry*, 19, 1980.)

Tacca aspera Roxb.

Synonym ► *T. integrifolia* Ker-Gawl.

Habitat ► Aka hills in Arunachal Pradesh.

Ayurvedic ► Vaaraahikanda (substitute), Vaaraahi. (*Dioscorea bulbifera* is equated with Vaaraahikanda.)

Folk ► Duukarkand (Gujarat).

Action ► Tuber—nutritive and digestive; applied to haemorrhagic diathesis, cachexia, leprosy and other cutaneous affections.

The tuber contains gamma-aminobutyric acid, glycine, leucine, valine, quercetin-3-arabinoside, D (–)-ribose, *n*-triacontanol, betulinic acid, castanogenin and taccalin.

Tacca pinnatifida Forst. f.

Synonym ► *T. leontopetaloides* (Linn.) Kuntze.

Family ► *Taccaceae.*

Habitat ► Entire Deccan Peninsula, extending into Madhya Pradesh and Bihar.

English ► Fiji Arrowroot, Tahiti Arrowroot.

Ayurvedic ► Suurana. (Instead of wild var., cultivated elephant-foot-yam, *Amorphophallus paeoniifolius* var. *campanulatus,* is used.)

Siddha/Tamil ► Karachunai.

Action ► Tuber—acrid, astringent, carminative, anthelmintic. Used in the treatment of piles, haemophilic conditions, internal abscesses, colic, enlargement of spleen, vomiting, asthma, bronchitis, elephantiasis and intestinal worms.

The tuber, macerated and repeatedly washed with water, yield a starch (76.0%).

The presence of beta-sitosterol, ceryl alcohol and taccalin (a bitter principle) has been reported in the tuber.

Taccagenin and leontogenin have been isolated froma acid hydrolysate of leaf extract. Diosgenin and its derivatives, isonarthogenin and isonuatigenin together with nuatigenin have also been isolated.

A bitter extract, prepared by washing the grated tubers in running water, is a rubefacient; and is also given in diarrhoea and dysentery.

Tagetes erecta Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Mexico; cultivated in gardens all over India.

English ► Big Marigold, Aztec or African Marigold.

Ayurvedic ► Jhandu, Gendaa.

Unani ► Sadbarg, Gul-hazaaraa, Gul-jaafari.

Siddha ► Thuruksaamanthi.

Action ► Whole plant—infusion useful in cold and bronchitis, also in the treatment of rheumatism.

Flowers—alterative; juice used for bleeding piles. Leaves—styptic, applied externally to boils and carbuncles; muscle pains. Leaves and florets—emengagogue, diuretic, vermifuge.

The flowers gave lutein esters of dipalmitate, dimyristate and monomyristate. Fresh petals gave hydroxyflavones, quercetagetin and tagetiin.

The plant yields an essential oil containing limonene, ocimene, linalyl acetate, linalool, tagetone and *n*-nonyl aldehyde as major components.

The aqueous extract of flowers showed activity against Gram-positive bacteria.

Tagetes minuta Linn., synonym *T. glandulifera* Schrank (North-west Himalayas; native to South America), known as Stinking-Roger, gives highest yield of the essential oil with high carbonyl content, calculated as tagetone among the *Tagetes* sp. grown in India.

Tagetes patula Linn. (Native to Mexico; cultivated in Indian gardens) known as French Marigold, is credited with nematocidal properties. The juice of flower heads is used on cuts and wounds.

Dosage ► Leaf—10–20 ml juice. (*CCRAS.*)

Talinum triangulare Willd.

Family ► *Portulaceceae.*

Habitat ► Native to tropical America; grown in Tamil Nadu.

English ► Ceylon Spinach, Surinam Purslane, Flame Flower, Sweet Heart, Water Leaf, Ceylon Spinach.

Folk ► Pasali, Cylon-keerai (Tamil Nadu)

Action ► Leaves—used in polyuria. Diabetics and invalids use the leaves as a substitute for *Amaranthus gangeticus* Linn.

Tamarindus indica Linn.

Synonym ► *T. occidentalis* Gaertn. *T. officinalis* HK.

Family ► *Caesalpiniaceae.*

Habitat ► Indigenous to tropical Africa; now distributed throughout the plains and sub-Himalayan tracts of India.

English ► Tamarind tree.

Ayurvedic ► Amli, Amlikaa, Suktaa, Chukraa, Chukrikaa, Chinchaa, Chandikaa, Tintidika.

Unani ► Tamar Hindi

Siddha/Tamil ► Puli, Aanvilam.

Action ► Pulp of fruit—cooling, digestive, carminative, laxative, antiscorbutic; infusion prescribed in febrile diseases and bilious disorders; used as a gargle in sore

throat; applied as a poultice on inflammatory swellings.

The Ayurvedic Pharmacopoeia of India recommends the fruit pulp in tiredness without exertion.

Leaves—juice, used for bleeding piles, bilious fever and dysuria. Stem-bark—antipyretic and astringent.

Used for diarrhoea. Bark is also prescribed in asthma and amenorrhoea. Seed-kernel—stimulant; used as a supporting tonic in sexual debility in Unani medicine.

Water stored in the tumbler, made out of the wood, is given for treating splenic enlargement.

Ethanolic extract of the seed coat exhibited antioxidant activity. Kernel gave polysaccharides composed of D-glucose, D-xylose, D-galactose and L-arabinose in a molar ratio of 8 : 4 : 2 : 1. Polysaccharides showed immunomodulatory activities such as phagocytic enhancement, leukocyte migration inhibition and inhibition of lymphocyte proliferation.

The leaves gave flavone C-glycosides—orientin, vitexin, *iso*-orientin and *iso*-vitexin. The leaves and fruits gave tartaric acid and malic acid. The fruit pulp yielded amino acids—serine, beta-alanine, proline, pipecolinic acid, phenylalanine and leucine.

A bitter principle, tamarindienal, isolated from the fruit pulp, showed fungicidal and bactericidal activity against *Aspergillus nigar, Candida albicans, Bacillus subtilis, Staphylococcus aureus, E. coli* and *Pseudomonas aeruginosa.*

The ash of the bark is given in colic and indigestion. The ash is also used in gargles and mouthwash for apthous sores.

Dosage ► Fruit pulp without seeds—4–10 g. (*API,* Vol. IV.)

Tamarix aphylla (Linn.) Karst.

Synonym ► *T. articulata* Vahl.
T. orientalis Forsk.

Family ► *Tamaricaceae.*

Habitat ► Saline soils of Punjab, Haryana, Rajasthan and Gujarat.

English ► Athel, Tamarisk.

Ayurvedic ► Maacheeka, Maachikaa.

Unani ► Maayin Khurd.

Siddha/Tamil ► Sivappattushavukku.

Folk ► Laal jhaau. Galls—Chhoti-Maayin.

Action ► Galls—astringent. Contain 50% tannin. Bark—contains 14% tannin.

Galls used as a substitute for oak-galls and sumac.

Galls contain polyphenols—gallic acid, ellagic acid, dehydrodigallic acid, dihydrojuglone-5-glucoside, isoferulic acid and juglanin; flavonoids including quercetin, its glucoside, isoquercitrin, its methyl derivative, tamarixetin and tamarixin.

Tamarix dioica Roxb.

Family ► *Tamaricaceae.*

Habitat ► Throughout in river beds and near sea-coasts in Tamil Nadu.

Ayurvedic ► Maachikaa (related species).

Siddha/Tamil ► Nirumari.

Folk ► Jhaau. Galls—Maayin.

Action ► Twigs and galls—astringent. Tannin content—leaves 8%, twig-bark 10%, galls 50%.

The leaves gave tamarixetin, kaempferide, quercetiin and D-mannitol. Aerial parts contain *trans*-2-hydroxymethoxycinnamic acid and isorhamnetin. Hexane extract gave hentriacontan-7-ol.

The flavones (tamaridone and tamadone) have also been isolated from ethanolic extract, along with hexacosyl-*p*-coumarate, gardenin, nevadensin and apigenin. Gardenin B exhibited antiviral and anti-invasive activity against solid tumours.

Tamarix ericoides Rottl.

Family ► *Tamaricaceae.*

Habitat ► South India, in river beds.

Ayurvedic ► Maachika (related species).

Folk ► Jhaau.

Action ► Galls—astringent. Leaves—decoction is given for treating enlarged spleen; also cough.

Tamarix indica Roxb.

Synonym ► *T. troupii* Hole. *T. gallica* auct. non Linn.

Family ► *Tamaricaceae.*

Habitat ► North Indian saline or water-logged soils; on sandy banks in West Bengal, Bihar, Orissa and South India.

English ► Takut Galls.

Ayurvedic ► Jhaavuka, Bahugranthikaa, Shaavaka.

Unani ► Maayeen Kalaan (large galls), Maayeen Khurd (small galls).

Siddha/Tamil ► Sirusavakku.

Folk ► Jhaau.

Action ► Galls—astringent, given internally in dysentery and diarrhoea. Infusion used as a gargle for sore throat. Decoction applied to foul and sloughing ulcers. Pulverized galls, mixed with Vaseline, used for piles and anal fissures. Manna—mild laxative and expectorant. Tannin content—galls 40–50%, bark 15.3%; tannin and non-tannin ratio, quite high as compared to oak bark.

Alcoholic extract of the whole plant exhibited antiallergic activity.

Dosage ► Gall, leaf, root—1–3 g powder. (*CCRAS.*)

Tanacetum vulgare Linn.

Synonym ► *Chrysanthemum vulgare* (L.) Bernh.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Europe; found as an escape in some parts of Kashmir.

English ► Tansy.

Folk ► Peilmundi (Kashmir).

Action ► Plant—anthelmintic, bitter tonic, emmenagogue. Used for migraine, neuralgia and nausea; as a lotion for scabies. Toxicity depends upon thujone content of the part used. Tansy oil is used as a liniment for gout and rheumatism.

Aerial parts afforded terpenoids—tanacetin, vulgarones A and B, tamirin, tanacin and tanavulgarol; germacanolides, stearic acid, and flavonoids—apigenin trimethyl ether, apigenin, luteolin, chrysoeriol, diometin, isorhamnetin, quercetin and axillarin. The leaves contain parthenolide, caffeic, chlorogenic, iso-chlorogenic acids and vibernitol.

Indian chemotype contains beta-thujone (28.1%) as the major constituent of the essential oil. Other constituents are: beta-thujyl alcohol 8.7, *l*-camphor 10.0 and cineol 11.8%. The leaves contain parthenolide, caffeic, chlorogenic, isochlorogenic acid and vibernitol.

Tanacetum parthenium (L.) Schultz Bip. (native to Europe and British Isles), known as Feverfew, is available in India for prophylactic treatment of migraine. The characteristic constituents of the herb (dried, whole or fragmented parts) are sesquiterpene lactones of which parthenolide, a germacanolide, is the major component. (Indian species, *T. vulgare* leaf also contains parthenolide).

ESCOP recommends the herb for the management of migraine for at least a few months.

(See *ESCOP* and *WHO* monographs.)

It has been shown that Feverfew extract inhibits prostaglandin production and arachidonic acid release (this activity, at least partly, explains the herb's antiplatelet and antifebrile action). The extracts also inhibit secretion of serotonin from platelet granules and proteins from polymorphonuclear leucocytes (PMN's). Since serotonin is implicated in the aetiology of migraine and PMN secretion is increased in rheumatoid arthritis. Feverfew is used in migraine and rheumatoid arthritis. (*Potter's New Cyclopaedia.*) Somehow, beneficial effects were not observed in a double-blind placebo-controlled trial on 40 women with rheumatoid arthritis. (*WHO.*)

Taraktogenos kurzii King.

Synonym ► *Hydnocarpus Kurzii* (King.)Warb.
H. heterophyllus Kurx.

Habitat ► Throughout upper Assam and Tripura in evergreen forests.

Folk ► Chaalmogra.

Action ► Kernel yields the true Chaalmoogra Oil (*Oleum Chaulmoograe*), used externally in leprosy.

Bark—astringent, rich in tannins, also used as a febrifuge.

Taraxacum officinale Weber ex Wiggers.

Family ► *Compositae; Asteraceae.*

Habitat ► Temperate Himalayas, Khasi Hills, Mishmi Hills, Gujarat and in hills of South India.

English ► Common Dandelion.

T

Ayurvedic ► Dugdh-pheni, Luutaari, Payaswani.

Unani ► Kaanful, Kaasani Dashti, Kaasani Sahraayi, Hind-baa-al-Barri. (Not to be confused with *Cichorium intybus*, known as Kaasani.)

Folk ► Dudhli, Dudhal.

Action ► Root—diuretic, cholagogue, pancreatic and bile duct stimulant, stimulant to portal circulation, choleretic, urinary antiseptic, detoxicant, promotes elimination of plasma cholesterol.
Used chiefly in kidney and liver disorders, for rheumatism and as a general tonic. A decoction is given for infective hepatitis.

Key application ► In dyspepsia, loss of appetite, and for diuresis. (*German Commission E, ESCOP.*) *ESCOP* indicates its use for restoration of hepatic and biliary function.

Most of the diuretics cause loss of potassium, but dandelion leaves contain high levels of potassium.

The leaves and root contain sesquiterpene lactones (bitter substances); triterpenes and sterols—beta-sitosterol, beta-sitosterol-glucosides, taraxasterol, *psi*-taratexol and taraxol; flavonoids, including among others, apigenin-7-O-glucosides and luteolin-7-O-glucosides; mucilages; inulin (2–40%, high values in autumn). The amaroids are cholagogic and secretolytic. (*PDR.*) An appetite-stimulating bitter has been identified as eudesmanolides (previously called taraxacin).

The vitamin A content is higher than in carrots.

The polysaccharides and aqueous extracts exhibited antitumour activity in animals. The anti-inflammatory activity has also been confirmed in animal studies.

The high K+ content of roots and leaves is considered responsible for the diuretic activity.

Dosage ► Root—1–3 g powder. (*CCRAS.*)

Tarenna asiatica (Linn.) Alston.

Synonym ► *Webra corymbosa* Willd.

Family ► *Rubiaceae.*

Habitat ► Peninsular region, ascending to an altitude of 1,000 m, and in Assam.

Folk ► Kuraa (Maharashtra).

Action ► Fruit—smashed and applied to boils to promote suppuration. Leaves— used in skin diseases.

The whole plant, including the roots, contained D-mannitol. The leaves contain a flavone, corymbosin.

T

Taverniera cuneifolia Arn.

Synonym ► *T. nummularia* Baker non-DC.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Plains of Punjab, Gujarat and the Deccan in waste places.

English ► East Indian Moneywort.

Folk ► Jethi-madh (Maharashtra).

Action ► Leaves—used as a poultice for sloughing wounds. Root—used as a substitute for liquorice.

Taxus baccata Linn.

Family ▶ *Taxaceae.*

Habitat ▶ Temperate Himalayas, Khasi Hills and Manipur.

English ▶ European Yew. Himalayan Yew is equated with *Taxus wallichiana* Zucc., synonym T. baccata Linn. subspecies *wallichiana* (Zucc.) Pilgoe, *T. baccata* Hook. f.

Ayurvedic ▶ Thunera, Sthauneya, Sthauneyaka, Shukapushpa, Dhaatri-patra, Vikarna. (Not a substitute for Taalisapatra.)

Unani ▶ Zarnab.

Siddha/Tamil ▶ Taaleespatri Bhedam.

Folk ▶ Birmi, Thuno.

Action ▶ Herb—CNS depressant; reduces motor activity; analgesic, anticonvulsant. Leaf used in nervousness, epilepsy, hysteria, asthma, chronic bronchitis. Leaf and fruit—antispasmodic, sedative, emmenagogue.

Berry—used in chronic bronchitis. Taxol—antimitotic; also being tried for the treatment of severe drug-resistant human malaria. (*Chem Abstr,* 1994, 21, 124674 j.) (The taxol content in Himalayan Yew varied with season and location from 0.045–0.130%.)

The needles contain diterpene esters of taxane-type (mixture is known as taxine 0.6–2.0%). Taxine consists of 11 compounds of which only taxine A and B have been characterized. Taxol, the diterpene amide, is found active against ovarian cancer in humans. (clinical results showed 24–30% response). The ester alkaloids in higher doses are cardiotoxic.

Dried needles contain biflavonoids, including sotetsuflavone, sequoiflavone, sciadopitysin, ginkgetin, kayaflavone, amentoflavone, beta-sitosterol, heptacosanol and surcose.

The needles gave several phenolics. Betuloside (rhododendron) exhibited hepatoprotective activity against hepatotoxins in rats.

The seeds are poisonous and contain taxine.

The aqueous extract of leaves showed a depressant effect on the central nervous system in rats.

The Ayurvedic Pharmacopoeia of India attributed antirheumatic, anticatarrhal, insecticidal and wound-healing properties to the dried needles of Himalayan Yew and indicated the use of the drug in powder form (1–3 g) in disorders due to vitiated blood, tumours, dermatosis and helminthiasis.

Dosage ▶ Leaf—1–3 g powder. (*API,* Vol. III.) Leaf, bark—3–5 g powder. (*CCRAS.*)

Tecoma stans (Linn.) H. B. & K.

Synonym ▶ *Stenolobium stans* (L.) D. Don.
Bignonia stans Linn.

Family ▶ *Bignoniaceae.*

Habitat ▶ Cultivated in gardens.

English ▶ Yellow Elder, Yellow Bells.

Siddha/Tamil ▶ Sonapaati, Thanga Arali, Naga Sambagam.

Action ► Leaves—hypoglycaemic (tecomine and tecostanine are hypoglycaemic alkaloids).

Root—diuretic, vermifuge.

The flowers contain beta-carotene and zeaxanthin. The plant gave phenolic acids, beta-sitosterol and triterpenoids—ursolic acid, oleanolic acid and alpha-amarine. An indole-metabolizing enzyme, indole-oxygenase, has been isolated from the leaves. Antidiabetic activity of the plant was tested on streptozotocin-induced diabetic rats.

Tecomella undulata (G. Don) Seem.

Synonym ► *Tecoma undulata* G. Don.
Bignonia undulata Sm.

Family ► *Bignoniaceae.*

Habitat ► North-West and Western India, and in the outer Himalayas.

English ► Rohida tree.

Ayurvedic ► Rohitaka, Rohi, Daadimpushpaka, Daadimchhada, Plihaghna. (*Amoora rohituka* is also known as Rohitaka.)

Action ► Bark—relaxant, cardiotonic, choleretic. (Heartwood toxic due to lapachol.) Used for the treatment of leucorrhoea, diseases of the liver and spleen, leucoderma, syphilis and other skin diseases.

The bark contains tecomin (veratryl beta-D-glucoside), alkanes, alkanols and beta-sitosterols. The bark also yielded chromone glycosides—undulatosides A and B, and iridoid glucosides—tecomelloside and tecoside. A quinonoid—lapachol, veratric acid and dehydrotectol are also reported from the bark.

Water soluble portion of the alcoholic as well as chloroform extracts of the bark shows smooth muscle relaxant, mild cardiotonic and chloretic activities.

Dosage ► Flower, bark—50–100 ml decoction. (*CCRAS.*)

Tectona grandis Linn. f.

Family ► *Verbenaceae.*

Habitat ► A tree occurring in Western Peninsula, Central India and Bihar.

English ► Teak tree.

Ayurvedic ► Shaaka, Bhuumisaha, Dwaaradaaru, Varadaaru, Kharachhada, Saagawaan, Saagauna.

Siddha/Tamil ► Thekku.

Action ► Flower—used in bronchitis, biliousness and urinary discharges. Flower and seed—diuretic.

Wood—expectorant, anti-inflammatory, antibilious, anthelmintic. Used for inflammatory swellings.

Bark—astringent. Used in bronchitis. Root—used for anuria and retention of urine. Nut oil—used in the treatment of scabies and other skin diseases; also for promoting hair growth.

The Ayurvedic Pharmacopoeia of India recommends the heartwood in lipid disorders, also for treating threatened abortion.

The wood is rich in anthraquinones, naphthalene compounds and triterpenic and hemi-terpenic compounds.

The Leaves contain tectoleafquinone. The bark contains 7.14% tannin. The seed oil contains linoleic acid (about 53%), along with lauric, myristic, palmitic, stearic, oleic, linolenic and arachidic acids. The kernels yield 44.5% of a fatty oil.

Dosage ▶ Heartwood—3–6 g powder. (*API,* Vol. III.)

Tephrosia purpurea (L.) Pers.

Synonym ▶ *T. hamiltonii* Drumm.

Family ▶ *Papilionaceae; Fabaceae.*

Habitat ▶ All over India; also grown as green manure and as cover crop.

English ▶ Purple Tephrosia, Wild Indigo.

Ayurvedic ▶ Sharapunkhaa, Vishikha-punkhaa, Sarphokaa.

Unani ▶ Sarponkhaa, Sarphukaa.

Siddha/Tamil ▶ Kattu-kolingi, Kolingi, Paavali, Mollukkay, Kollukkayvelai.

Action ▶ The drug is considered specific for the treatment of inflammation of spleen and liver (is known as Plihaa-shatru, Plihaari in Indian medicine).

Dried herb—diuretic, deobstruent, laxative. Given for the treatment of cough, bronchitis, bilious febrile attacks, insufficiency of the liver, jaundice (not effective in infantile cirrhosis), kidney disorders and for the treatment of bleeding piles, boils, pimples. Also used as a gargle. Root—decoction used in dyspepsia, diarrhoea, cough, bronchitis, adenoids, asthma and rheumatism. Juice is applied to skin eruptions. A liniment prepared from the root is employed in elephantiasis. Oil from seeds—specific against eruptions of the skin, eczema, scabies, leprosy. Seed extract—hypoglycaemic.

Powdered aerial parts prevented elevation of SGOP, SGPT and bilirubin levels.

Hepatoprotective effect of aerial parts was evaluated against (+)-galactosamine-induced and carbon tetrachloride-induced hepatotoxicity in rats.

The leaves contain rutin and rotenoids (0.65–0.80% on dry basis). Rotenoid content is highest in the seed (1.60–1.80%).

The leaves also contain a triterpenoid, lupeol, and beta-sitosterol.

Seeds contain a diketone-pongamol; a dimethylchromene flavanone isolonchocarpin; furanoflavones karanjin and kanjone; a flavanone purpurin; and sitosterol. A flavonoid, lanceolarin B, is also present in seeds.

The plant extract led to marked lowering of blood glucose level in normal and alloxan-induced diabetic rabbits. In diabetic rabbits the extract exerted 60–70% hypoglycaemic effect as compared to tolbutamide.

Shveta Sharapunkhaa (stems: covered with white hair; flowers: pale pink or pale violet) is equated with *T. villosa* Pers.

The roots gave a prenylated flavanone 7-methylglabranin; pods contain rotenoids—villosin, villon, villosol, villosinol, villinol and villosone.

The fresh root is credited with hypoglycaemic properties, but leaves did

not show any such effect. The juice of the leaf is given in dropsy. Ayurvedic classical texts describe it as a special drug for treating sterility in women.

Boiled leaves of *T. uniflora* subspecies *petrosa* (Kant-punkhaa) are used for the treatment of syphilis. The medicinal properties of the plant are more or less similar to those of *T. purpurea,* but to a milder degree.

T. spinosa Pers. (South India, ascending to 400 m in hills) is also known as Kant-punkhaa (Mulukolingi in Tamil Nadu).

The root is applied to inflammations and swellings of joints; a decoction is given in rheumatism.

Chalcones, spinochalones A and B and flemistrictin A have been isolated from the root. Spinochalone C and spinoflavonones A and B, and fulvinervin A have been isolated from the plant.

Dosage ► Plant, root, seed—3–5 g powder. (*CCRAS.*)

Teramnus labialis Spreng.

Family ► *Papilionaceae.*

Habitat ► Punjab, eastwards to Bengal, extending southwards into Peninsular India.

Ayurvedic ► Maashaparni, Mahaasahaa, Suuryaasani, Lomash-parni, Kaamboja, Krishna-vrintaa. (In Kerala different species of *Vigna* are used as Maashaparni.)

Siddha/Tamil ► Kattu-ulandu.

Action ► Fruit—astringent, stomachic, febrifugal; also used as a nervine tonic in tuberculosis, haemoptysis, rheumatism and paralysis. Considered invigorating in Indian medicine.

The Ayurvedic Pharmacopoeia of India recommends the plant in spermatorrhoea.

In Ayurvedic texts, Maashaparni and Mudgaparni together form a group of rejuvenating drugs.

Mudgaparni is equated with *Phaseolus trilobus.* Maashaparni and Maasha (*Vigna mungo*) are different drugs.

Dosage ► Whole plant—5–10 g powder. (*API,* Vol.III.)

Terminalia arjuna (Roxb.) W. & A.

Family ► *Combretaceae.*

Habitat ► Throughout the greater part of India, also grown as an avenue tree.

English ► Arjun Terminalia.

Ayurvedic ► Arjuna, Dhananjaya, Kaakubha, Kakubha, Aartagala, Indravriksha, Paartha, Virataru, Viravriksha.

Unani ► Arjun

Siddha ► Marudam.

Action ► Bark—used as a cardioprotective and cardiotonic in angina and poor coronary circulation; as a diuretic in cirrhosis of liver and for symptomatic relief in hypertension; externally in skin diseases, herpes and leukoderma. Powdered bark is prescribed with milk in fractures

and contusions with excessive ecchymosis, also in urinary discharges and strangury. Fruit—deobstruent.

The Ayurvedic Pharmacopoeia of India recommends the powder of the stembark in emaciation, chest diseases, cardiac disorders, lipid imbalances and polyuria.

The bark extract contains acids (arjunolic acid, terminic acid), glycosides (arjunetin, arjunosides I–IV), and strong antioxidants—flavones, tannins, oligomeric proanthocyanidins.

The bark extract (500 mg every 8 h) given to (58 male) patients with stable angina with provocable ischemia on treadmill exercise, led to improvement in clinical and treadmill exercise parameters as compared to placebo therapy.

These benefits were similar to those observed with isosorbide mononitrate (40 mg/day). (*Indian Heart J.* 2002, 54(4), 441.)

Arjunolic acid exhibited significant cardiac protection in isoproterenol-induced myocardial necrosis in rats. (*Mol Cell Biochem,* 2001, 224 (1–2), 135–42.) A study demonstrated that the alcoholic extract of *Terminalia arjuna* bark augmented endogenous antioxidant compounds of the rat heart and prevented from isoproterenol-induced myocardial ischemic reperfusion injury. (*Life Sci.* 2003, 73 (21), 2727–2739.) Cardiac lipid peroxidation in male Wistar rats was reduced by 38.8% ± 2.6% at a dose of 90 mg/kg, in a study based on aqueous freeze-dried extract of the bark. (*Phytother Res.* 2001, 15(6), 510–23.)

Oral administration of bark powder (400 mg/kg body weight) for 10 days produced significant increase in circulating histamine, a little increase in 5-HT, catecholamines and HDL cholesterol, and decrease in total lipid, triglycerides and total cholesterol in normal rats.

Casuarinin, a hydrolyzable tannin, isolated from the bark, exhibited antiherpes virus activity by inhibiting viral attachment and penetration. 50% ethanolic extract of the bark exhibited significant increase in the tensile of the incision wounds.

Dosage ► Stembark—3–6 g powder. (*API,* Vol. II.)

Terminalia bellirica Roxb.

Family ► *Combretaceae.*

Habitat ► Throughout deciduous forests of India.

English ► Belleric Myrobalan, Bastard Myrobalan.

Ayurvedic ► Bibhitaka, Vibhitaka, Bibhitaki, Bibhita, Baibhita, Aksha, Akshaka, Kaamaghna, Kalidru Kali, Karshaphala.

Unani ► Balelaa, Baheraa.

Siddha/Tamil ► Thaanrikkaai, Thandri.

Action ► Fruit—purgative when half ripe, astringent when ripe; antipyretic; used in prescriptions for diarrhoea, dyspepsia, biliousness; cough, bronchitis and upper respiratory tract infections, tropical pulmonary eosinophilia and allergic eruptions.

The Ayurvedic Pharmacopoeia of India recommends the drug in powder form in emesis and worm infestation, in addition to other therapeutic applications.

The fruits contain beta-sitosterol, gallic and ellagic acids, ethyl gallate, galloyl glucose, chebulagic acid and a cardiac glycoside, bellaricanin.

The fruits produce hepato-protective effect in CCl4-induced liver injury in mice. Alcoholic extract of the fruit exerted a negative chrono-and inotropic and hypotensive effect of varying magnitude in a dose dependent fashion on isolated rat and frog atria and rabbit heart.

The fruit contains all components of Chebulic myrobalan (*T. chebula*) except corilagin and chebulic acid.

The fleshy fruit pulp contains 21.4% tannin, both condensed and hydrolysable types.

The flower showed spermicidal activity.

Dosage ► Fruit—3–6 g powder. (*API*, Vol. I.)

Terminalia bialata Steud.

Family ► *Combretaceae.*

Habitat ► Andamans.

English ► White Chuglam, Silvergrey Wood.

Action ► Bark—cardiac stimulant. It contains tannins and is used as an adulterant to cutch.

Terminalia catappa Linn.

Synonym ► *T. procera* Roxb.

Family ► *Combretaceae.*

Habitat ► Cultivated throughout hotter parts of India, also in the Andamans.

English ► Indian Almond, Tropical Almond.

Siddha/Tamil ► Natuvadom.

Folk ► Jangali Baadaam, Desi Baadaam.

Action ► Bark—astringent, antidysenteric, mild diuretic. Leaf—antiseptic, anti-inflammatory. Oil from kernel—substitute for almond oil; contains oleic, linoleic, palmitic and stearic acids. Fresh kernels resemble almonds; contain fat 52.02, protein 25.42, sugars as glucose 5.98%. Leaf—sudorific; applied to rheumatic joints. Ointment made from juice—used in scabies and other cutaneous affections.

The husk and endocarp contain tannins and pentosans. The heartwood and stembark contain beta-sitosterol and its palmitate. The heartwood, in addition, contain terminolic acid and triterpenic methyl esters.

T

Terminalia chebula Retz.

Family ► *Combretaceae.*

Habitat ► Abundant in Northern India. Also occurs in the forests of Assam, West Bengal, Bihar, Assam, especially in Konkan.

English ► Chebulic Myrobalan, Black Myrobalan.

Ayurvedic ► Haritaki, Kaayasthaa, Pathyaa, Shreyasi, Shivaa. (Jivanti,

Puutanaa, Vijayaa, Abhayaa, Rohini, Chetaki, Amritaa—according to some scholars, these represent seven varieties of Haritaki; now used as synonyms.)

Unani ▶ Harad, Halelaa siyaah, Halelaa zard, Halelaa Kaabuli (varieties).

Siddha/Tamil ▶ Kadukkai.

Action ▶ Gentle purgative, astringent (unripe fruits are more purgative, ripe ones are more astringent; sennoside A and anthraquinone glycoside is laxative, tannins are astringent), stomachic, antibilious, alterative. Used in prescriptions for treating flatulence, constipation, diarrhoea, dysentery, cyst, digestive disorders, vomiting, enlarged liver and spleen, cough and bronchial asthma, and for metabolic harmony. Bark—diuretic.

The Ayurvedic Pharmacopoeia of India, along with other therapeutic applications, indicated the use of powder of mature fruits in intermittent fevers, chronic fevers, anaemia and polyuria.

The fruits of *T. chebula* are used in combination with *Emblica officinalis* and *T. bellirica* (under the name *Triphalaa*) in the treatment of liver and kidney dysfunctions. The main purgative ingredient of *Triphalaa* is *T. chebula* (the purgative principle is in the pericarp of the fruit).

Shikimic, gallic, triacontanoic and palmitic acids, beta-sitosterol, daucosterol, triethyl ester of chebulic acid and ethyl ester of gallic acid; a new ellagitannin, terchebulin, along with punicalagin and teaflavin A have been isolated from the fruits. A new triterpene, chebupentol, and arjungenin, terminoic acid and arjunolic acid were also isolated from the fruit.

Antioxidant constituents of the plant, phloroglucinol and pyrogallol have been isolated along with ferulic, vanillic, *p*-coumaric and caffeic acids. Ether extract showed higher antioxidant activity than BHA and BHT, Acid esters present in phenolic fraction of extract, were found most effective.

Dosage ▶ Pericarp of mature fruit—3–6 g powder. (*API,* Vol. I.)

Terminalia citrina Roxb. ex Flem.

Family ▶ *Combretaceae.*

Habitat ▶ Foothills of Himalayas from Nepal eastwards to Assam.

Folk ▶ Haritaki (Bengal); Monalu (Assam), Suravaari Harad (Gujarat).

Action ▶ Bark—diuretic, cardiotonic. Fruits—used as those of *T. chebula.*

The tannin in the fruit is reported to be between 30–40% of the dry weight.

Terminalia coriacea Wight & Arn.

Family ▶ *Combretaceae.*

Habitat ▶ Western Andhra Pradesh and Central India.

English ▶ Leathery Murdah.

Folk ▶ Tani (Andhra Pradesh)

Action ▶ Bark—cardiac stimulant.

Terminalia myriocarpa Heurck & Muell.-Arg.

Family ► *Combretaceae.*

Habitat ► Eastern Himalayas, from North Bengal eastwards to Assam, Khasi Hills and Arunachal Pradesh.

English ► Hollock.

Ayurvedic ► Kakubha (also a synonym of Arjuna tree).

Action ► Bark—cardiac stimulant, mild diuretic.

The bark gave beta-sitosterol, and about 18% tannins. Ellagic, gallic, chebulinic and chebulagic acids—main constituents of ellagitannins, and leuco-cyanidin, an important precursor to flavonoid tannins, have been isolated.

Terminalia paniculata Roth.

Family ► *Combretaceae.*

Habitat ► Forests of Western Ghats and Eastern Ghats up to 1,200 m.

English ► Flowering Murdah.

Folk ► Kinjal (Maharashtra); Neemeeri, Nimiri (Andhra Pradesh); Pekadukkai (Tamil Nadu); Pilamuruthu, Pillamurda (Kerala). Kindal (trade).

Action ► Bark—diuretic, cardiotonic. Juice of the bark, mixed with purified butter and rock-salt, is applied in parotitis.

The heartwood gave 3,3′-O-dimethylellagic acid and 3,4,3′-O-trimethylflavellagic acid. A triterpene carboxylic acid, beta-sitosterol, a glycoside 3,3′-di-O-methylellagic acid-4-monoglucoside and O-pentamethyl flavellagic acid have been isolated.

The bark contains 14% tannins, also beta-sitosterol.

Terminalia tomentosa W. & A.

Synonym ► *T. alata Heyne* ex Roth.

Family ► *Combretaceae.*

Habitat ► Common in the forests, especially in the humid regions of India, including the sub-Himalayan tracts of North-West provinces, Nepal and Sikkim; also southwards throughout the Peninsula.

English ► Laurel (trade). (*The Wealth of India.*)

Ayurvedic ► Asana (Asana is equated with *Bridelia montana* Willd.) Bijaka (also equated with *Pterocarpus marsupium* Roxb.) (Asana and Bijaka are considered as synonyms in Indian medicine.) Jaranadrum, a substitute of Ashwakarna, and Kaushik are also doubtful synonyms.

Siddha/Tamil ► Karramarda.

Folk ► Sarj, Saaj. Sain (Dehra Dun).

Action ► Bark—astringent, antidiarrhoeal, styptic, antileucorrheal. Used for haemorrhagic diseases, skin diseases, erysipelas, leucoderma. The bark contain 18.7% tannin.

Beta-sitosterol, arjunic and arjunolic acids, arjunetin, betulinic and ellagic acids have been isolated from the bark.

T

Hydrolysis of gum gave oligo-saccharides, disaccharides and monosaccharides. Leaves and fruits gave beta-sitosterol.

Laurel is native to Mediterranean region and is equated with *Laurus nobilis* Linn. (*Lauraceae.*) The leaves and essential oil are stomachic, cholagogue, stimulant and diaphoretic. The oil has been used against dandruff, also as an external application for rheumatism.

Tetracera indica Merrill.

Synonym ► *T. assa* DC.

Family ► *Dilleniaceae.*

Habitat ► Assam.

Siddha/Tamil ► Anaitticha l. (A related species *T. laevis* Vahl, is found in the forests of Kerala.)

Action ► Leaves—an infusion of shoots is given in pulmonary haemorrhages and is used as a gargle in aphthae.

The leaves yielded beta-sitosterol, lupeol, betulin and betulinic acid.

T. laevis (Vennelvalli, Piripul) also possesses similar properties. A decoction of leaves, mixed with rice-gruel, is given for the treatment of aphthae.

Tetragonia expansa Murr.

Synonym ► *T. tetragonioides* (Pall.) O. Kuntze.

Family ► *Tetragoniaceae.*

Habitat ► Cultivated in the hills of North Bengal, Shillong and other hill stations, and in the Deccan, in Mysore.

English ► New Zealand Spinach.

Folk ► Chikesoppu (Karnataka).

Action ► Used as a substitute for *Spinacia oleracea*, as a rich source of calcium, phosphorus, iron and vitamins A, B and C. Given in pulmonary and intestinal affections.

The shoots of the plant contain saponin, but the seeds do not. The saponin has low toxicity which disappears on boiling the leaves. A sample of the plant contained 1.2% oxalic acid, combined as calcium oxalate which is higher than found in common spinach. Losses of phosphorus and iron on cooking are also reported to be high.

The roots, leaves and immature fruits gave positive reaction for the presence of alkaloids. Cerebroside has been synthesized.

Tetrastigma serrulatum Planch.

Synonym ► *Vitis capreolata* D. Don.

Family ► *Vitaceae.*

Habitat ► From Garhwal to Bhutan, up to an altitude of 2,600 m.

Folk ► Charchari (Nepal).

Action ► Alcoholic extract of aerial parats, when injected intramuscularly in rats, showed anticancer activity.

The plant was found toxic to adult albino mice.

T

Teucrium chamaedrys Linn.

Family ► *Labiateae; Lamiaceae.*

Habitat ► Native to Europe. Imported for use in Unani medicine.

English ► Germander, Wall Germander.

Unani ► Usqurdiyun, Kamaazariuus.

Action ► Gastric stimulant, diuretic, sudorific. Used in spleen disorders and rheumatism; topically in skin diseases.

The herb contains iridoid glycosides, including harpagide and acetyl harpagide; clerodane and neoclerodane diterpenes; phenylpropanoids; volatile oil, containing about 60% caryophyllene; tannins and polyphenols.

One of the major furanoneoerodane diterpenes, teucrin A, is hepatotoxic.

Ether extract of the flowering herb shows antibacterial activity.

Teucrium scordium Linn.

Family ► *Labiatae, Lamiaceae.*

Habitat ► Native to Europe; found in Kashmir.

English ► Water-Germander.

Action ► Stimulant, antiseptic, sudorific. Given for phthisis and cough. An infusion is used as laxative in piles, as a gargle in sore throat and stomatitis. An extract of the herb is given in lupus and actinomycosis. Flower tops and leaves—astringent, diaphoretic, vermifuge.

The herb contains iridoids, including harpagide and acetyl harpagide; furanoid diterpenes; also choline, rutin, quercetin, iso-quercetin, stigmasterol, beta-sitosterol, beta-amyrin, chlorogenic and ursolic acids.

Thalictrum foliolosum DC.

Family ► *Ranunculaceae.*

Habitat ► The temperate Himalayas from 1,500 to 2,400 m, in the Khasi hills and in Kashmir, Punjab, Delhi, Uttar Pradesh, Bihar and Orissa.

Ayurvedic ► Pitarangaa, Piyaaraangaa. Pitamuulikaa (substitute).

Unani ► Mamiri. (Mamiraa is equated with *Coptis teeta* Wall.)

Action ► Plant—used against gout and rheumatism. Root—febrifuge, antiperiodic; a bitter tonic during convalescence.

The root contains alkaloids berberine and magnoflorine. (Berberine causes a stimulant action on the movements of the gastrointestinal tract, a depression of both the auricles and ventricles and distinct dilatation of the heart. Magnoflorine induces hypotention.) Berberine content is reduced to one-fourth and magnoflorine to traces after 6 months. The root also contains palmitine and jatrorrhizine.

Thalictrum sp. (about 17 species are found in India)—alkaloidal structure exhibits antitumoral activity.

Over 60 isoquinoline and diterpenoid alkaloids have been isolated. (See *The Wealth of India,* Vol. X.)

Following are the important *Thalictrum* sp. occurring in India:

T. alpinum Linn. (the alpine Himalayas and western Tibet at altitudes between 3,000 and 5,100 m); *T. elegans* Wall. ex Royle (the sub-alpine Himalayas from Kashmir to Sikkim at altitudes from 3,000 to 3,900 m); *T. foetidum* Linn. (North-West Himalayas); *T. javanicum* Blume (the temperate Himalayas from Kashmir to Sikkim, Khasi hills, Kodaikanal and Nilgiri hills); *T. minus* Linn. (the temperate Himalayas); *T. reniforme* Wall. (the temperate Himalayas from Kulu to Sikkim between 2,400 and 3,000 m).

Themeda arundinacea (Roxb.) Ridley.

Synonym ► *Anthistiria gigantea* Hack. subspecies *arundinacea* Hack.

Family ► *Gramineae; Poaceae.*

Habitat ► The Himalayas and plains of India.

English ► Ulla Grass. Karad grass is equated with *T. quadrivalvis* (L.) Kuntze.

Folk ► Sarkharaa, Kapoor Ghass.

Action ► Febrifuge.

Theobroma cacao Linn.

Family ► *Sterculiaceae.*

Habitat ► Native to tropical America; cultivated in South India and Orissa.

English ► Cocoa, Theobroma, Chocolate tree.

Action ► Leaves—Central nervous system stimulant, local anaesthetic (due to cocaine).

Seeds—stimulating and diuretic (due to caffeine).

Cocoa contains methylxanthine, which acts as a diuretic. Preparations of Cocoa are used for liver, bladder and kidney ailments, diabetes, as a general tonic and as an astringent for diarrhoea. Cocoa and cocoa products can cause migraine headache, can also result in constipation.

Included among unapproved herbs by *German Commission E.*

Thespesia lampas (Cav.) Dalz. & Gibs.

Synonym ► *Azanza lampas* (Cav.) Alef.

Family ► *Malvaceae.*

Habitat ► Grown as an ornamental.

Ayurvedic ► Tundikera.

Folk ► Bana-Kapaasi. Raan-bhendi (Maharashtra).

Action ► Flowers—used for cutaneous diseases. Roots and fruits—used for treating gonorrhoea and syphilis.

Gossypol is reported to be present in the plant—roots 2.75, flower buds 1.95, seeds 1.74, leaves 0.98 and stems 0.16%. The flowers contain quercetin and protocatechuic acid.

Thespesia populnea
Soland. ex Correa.

Synonym ► *Hibiscus populneus* Linn.

Family ► *Malvaceae.*

Habitat ► Coastal regions of India and the Andamans; and also grown as an ornamental.

English ► Portia tree, Tulip tree, Umbrella tree, False Rosewood.

Ayurvedic ► Paarisha, Kapitana, Paarshvpippala, Gardabhaanda.

Siddha ► Poovarsu.

Action ► Specific for skin diseases. Root, fruit and leaf—used in psoriasis, scabies and other cutaneous diseases. Lupenone, lupeol and alkanes show activity against both Gram-positive and Gram-negative bacteria. Bark—used for the treatment of haemorrhoids and chronic dysentery. Leaf— anti-inflammatory.

The flowers gave populnetin, herbacetin, populneol, quercetin and its glycosides, kaempferol and its glycosides, rutin, gossypol, beta-sitosterol and its glycosides, nonacosane, lupenone, myricyl alcohol, lupeol and gossypetin.

Presence of thespesin (0.4%) and herbacetin has been reported from fruits. Thespesin has been proved to be optically active gossypol. Gossypol occurring in cotton plant is optically inactive, whereas the gossypol from *T. populnea* has a high dextro-rotation. It exhibits antifertility, anti-tumour, anti-amoebic and anti-HIV activities.

The ethanolic extract of fruits showed antiviral and anticancer activity in mice.

Thevetia peruviana
(Pers.) K. Schum.

Synonym ► *T. neriifolia* Juss. ex Steud.

Family ► *Apocynaceae.*

Habitat ► Native to tropical America; cultivated as hedge plant in the plains throughout India.

English ► Yellow Oleander.

Ayurvedic ► Pita-Karavira, Ashvaghna, Divyapushpa. (White and red-flowered var. is equated with *Nerium oleander,* the yellow-flowered var with *T. peruviana.*)

Siddha/Tamil ► Pachiyalari.

Action ► See *Nerium oleander.* Bark and leaves—bitter cathartic, emetic; poisonous. Roots—a plaster is applied to tumours.

All parts of the plant produce poisonous latex. Karnels contained nearly seven times as much glycosides as leaves, stems, flowers or fruit pulp. The roots and bark also contain glycosides.

Of all Thevetia glycosides, peruvoside is the most important cardiac glycoside. It produced a fall in right arterial pressure and a rise in cardiac output. A few cases of arrhythmia responded well to peruvoside. Thevetin and other glycosides are reported to exhibit digitalis-like effect. As a cardiac glycoside, the potency of neriifolin is moderate. Cerberin is even weaker than neriifolin. Cerebroside is the weakest glycoside in its cardiac effect.

In addition to seeds, neriifolin and peruvoside have been isolated from the bark in small amounts.

Dosage ► Root—50–125 mg powder. (*CCRAS.*)

Thlaspi arvense Linn.

Family ► *Cruciferae; Brassicaceae.*

Habitat ► The temperate and sub-alpine Himalayas.

English ► Pennycress, Fanweed.

Folk ► Drekaa (Laddakh).

Action ► Astringent, diuretic, blood-purifier. Seeds—stimulant. Plant—a good source of vitamin C (70–469 mg/100 g). Ripe seeds are poisonous (pouring boiling water over the seeds before use prevents poisoning).

Leaves as well as seeds contain a glucoside, sinigrin.

Thuja orientalis Linn.

Synonym ► *Biota orientalis* Endl.

Family ► *Cupressaceae.*

Habitat ► Native to China; planted all over India in gardens.

English ► Oriental Arbor-Vitae.

Folk ► Morepankhi.

Action ► Leaves—diuretic, insecticidal antipyretic.

The leaves contain rhodoxanthin, amentoflavone, hinokiflavone, quercetin, myricetin, carotene (20.8 mg/100 g dry basis), xanthophyll and ascorbic acid (68 mg/100 g). Essential oil, obtained from twigs (0.32) and berries (0.25%), contains alpha-thujene, (+)-sabinene, (+)-camphene, cedrol, cedrenol and alpha-and beta-pinenes as major constituents.

American Arbor-Vitae and White Cedar has been equated with T. occidentalis and is used as Thuja.

It was introduced into India from North America, and grows as a Christmas tree in the plains of India.

Leaves—an infusion is used as a uterine stimulant, emmenagogue and diuretic. Boiled in lard, are applied externally for rheumatism. Bark—astringent, emmenagogue, diuretic. Oil—poisonous, disinfectant, insecticidal. Seed and fruit— antibacterial; inhibited the growth of Gram-positive microorganisms.

The leaves yields a volatile oil, containing thujone as major component, with *iso*-thujone, borneol, bornyl acetate, *l*-fenchone, limonene, sabinene, camphor, *l*-alpha-thujene; flavonoids, mucilage, tannins.

The heartwood yields a non-toxic antibiotic substance. It gave sesquiterpene alcohols—occidentalol and occidol; also alpha-beta-and gamma-eudesmol.

Thuja is used in homoeopathy for tissue degeneration and tumours, warts and fungoid growths, both internally and externally.

Thymus serpyllum Linn.

Family ► *Labiatae; Lamiaceae.*

Habitat ► Native to North America; also found in temperate Himalayas from Kashmir to Nepal; grown in gardens in western India.

English ▶ Mother-of-thyme, Wild Thyme. *Thymus vulgaris* (Garden Thyme) is found in the Nilgiris at higher elevations.

Ayurvedic ▶ Ajagandhaa, Vana-Yavaani. (Not to be confused with Yavaani, Ajmodaa, Shataahvaa, Raajikaa and Tilaparni.)

Unani ▶ Haashaa, Jangali Pudinaa.

Action ▶ Antiseptic, antibacterial, antifungal, antiviral, antispasmodic, mild sedative, expectorant. *T. serpyllum* and *T. vulgaris* L. are used for coughs and common cold.

Key application ▶ *German Commission E* approved *T. vulgaris* for symptoms of bronchitis, whooping cough and catarrhs of the upper respiratory tracts. Also to treat stomatitis. (*ESCOP.*)

The British Herbal Pharmacopoeia recognizes expectorant activity of *T. serpyllum*.

T. serpyllum contains more linalool and *p*-cymol than Garden Thyme (*T. vulgaris*). Major constituent of the volatile oil of both the species (highly variable) is thymol; with carvacrol (lesser amount in *T. serpyllum,* higher in *T. vulgaris*), 1,8-cineole, borneol, geraniol, linalool. bornyl and linalyl acetate, thymol methyl ether and alpha-pinene.

Flavonoids include apigenin, luteolin, thymonin, naringenin; other constituents include labiatic acid, caffeic acid, tannins.

The flavonoid fraction has shown to have a potent effect on smooth muscle on guinea-pig trachea and ileum.

Thymol is expectorant and antiseptic. Thymol and carvacrol are spasmolytic. Thymol is also urinary tract antiseptic and anthelmintic.

Dosage ▶ Whole plant—3–5 g powder. (*CCRAS.*)

Thysanolaena agrostis Nees.

Synonym ▶ *T. maxima* (Roxb.) Kuntze.

Family ▶ *Gramineae; Poaceae.*

Habitat ▶ Cultivated in gardens.

English ▶ Bouquet-Grass, Broom-Grass, Tiger-Grass, Amliso.

Ayurvedic ▶ Juurnaa, Juurnaahv.

Folk ▶ Junaar, Pirlu.

Action ▶ Root—a decoction is used as a mouthwash during fever, also after parturition.

Tilia sp. Linn.

Family ▶ *Tiliaceae.*

Habitat ▶ Temperate regions of northern hemisphere. Spp. introduced into India: *Tilia cordata* Mill. (Himachal Pradesh at elevations of 2,100 m.) and *T. europaea* Linn., synonym *T. vulgaris* Hayne (Kulu, Manali and Simla).

English ▶ Small-leaved Lime or Linden and Common Lime or European Linden (respectively).

Action ▶ Flowers—nervine tonic, spasmolytic, sedative, hypotensive. An infusion is used for the treatment of hysteria and indigestion.

The flowers contain a volatile oil up to about 0.1% containing farnesol; flavonoids including hesperidin, quercetin, astralagin, tiliroside; phenolic acids such as chlorogenic and caffeic, tannins and mucilage (in the bract).

In Western herbal, the flowers are an ingredient in blood pressure tablets and mixtures and blood pressure medicinal teas.

Tiliacora acuminata
(Lam.) HK. f. & Thoms.

Synonym ► *T. racemosa* Colebr.

Family ► *Menispermaceae.*

Habitat ► Throughout tropical India.

Siddha/Tamil ► Kodaparuavalli.

Folk ► Tiliyaa-koraa (Bihar, Bengal).

Action ► Plant—CVS and CNS active, spasmolytic, hypothermic. Used externally for skin diseases.

The rootbark contains bis-benzylisoquinoline alkaloids—tiliacorine, tiliarine, tiliacorinine, nor-tiliacorinines A and B, corine, tiliacine and mohinine. The alkaloid tiliacoridine has been reported from the leaves.

Tinospora cordifolia
(Willd.) Miers ex Hook. f. & Thoms.

Family ► *Menispermaceae.*

Habitat ► Tropical India and the Andamans.

Ayurvedic ► Guduuchi, Guduuchikaa, Guluuchi, Amrita, Amritaa, Amritalataa, Amritavalli, Chinnaruuhaa, Chinnodbhavaa, Madhuparni, Vatsaadani, Tantrikaa, Kundalini. Guduuchi sattva (starch).

Unani ► Gilo, Gulanchaa. Sat-e-Gilo (starch).

Siddha ► Seenil, Amrida-valli.

Folk ► Giloya.

Action ► Herb—antipyretic, antiperiodic, anti-inflammatory, antirheumatic, spasmolytic, hypoglycaemic, hepatoprotective. Water extract increases urine output. Stem juice—prescribed in high fever; decoction in rheumatic and bilious fevers. Aqueous extract of the plant—fabrifuge. Starch—antacid, antidiarrhoeal and antidysenteric.

The Ayurvedic Pharmacopoeia of India, along with other therapeutic applications, recommends the dried stems in jaundice, anaemia, polyuria and skin diseases.

The stem contains alkaloidal constituents, including berberine; bitter principles, including columbin, chasmanthin, palmarin and tinosporon, tinosporic acid and tinosporol.

The drug is reported to possess one-fifth of the analgesic effect of sodium salicylate. Its aqueous extract has a high phagocytic index.

Alcoholic extract of the stem shows activity against *E. coli.* Active principles were found to inhibit *in vitro* the growth of *Mycobacterium tuberculosis.*

Oral administration of alcoholic extract of the root resulted in a significant reduction in blood and urine glucose and in lipids in serum and tissues of

alloxan diabetic rats. (*Phytother Res.* 2003 17 (4), 410–3.)

A significant reduction in levels of SGOT, SGPT, ALP and bilirubin were observed following *T. cordifolia* treatment during CCl4 intoxication in mature rats. (*J. Toxicol* Sci. 2002, 27 (3), 139–46.) The plant extract showed *in vitro* inactivating activity in Hepatitis-B surface antigen. (*Indian Drugs,* 1993, 30, 549.)

A new hypoglycaemic agent was isolated from the plant; it was found to be 1,2-substituted pyrrolidine.

The starch from roots and stem, used in chronic diarrhoea and dysentery, contains a polysaccharide having 1–4 glucan with occasional branching points.

Dosage ► Stem—3–6 g powder; 20–30 g for decoction. (*API,* Vol. I.)

Tinospora crispa
Linn. Miers ex Hook. f. Thoms.

Synonym ► *T. rumphii* Boerl.

Family ► *Menispermaceae.*

Habitat ► Assam.

Ayurvedic ► Guduuchi (related species).

Action ► Plant—diuretic, as powerful a febrifuge as cinchona.

The plant contains a bitter principle picrotein and furanoditerpene glycoside, tinocrisposide.

Stem, roots and tubers contain a diterpenoid—tinosporan, which appears to be closely related to columbin.

The mucilage from leaves gave galactan, pentosan, methyl pentosan and sugars.

Tinospora malabarica
Miers ex Hook. f.

Synonym ► *T. sinensis* (Lour.) Merrill.
T. tomentosa (Colebr.) Miers.

Family ► *Menispermaceae.*

Habitat ► Throughout India, ascending to an altitude of 1,000 m.

Ayurvedic ► Kandodbhava-guduchi, Vatsaadani, Padma-Guduuchi.

Folk ► Gurch.

Action ► Fresh leaves and stem are used in chronic rheumatism. Known as “muscle-relaxing vine” in China.

Used as a substitute for *T. cordifolia.*

The plant is an inferior substitute as it contains less of carbohydrates, sterols, alkaloids and tannins.

Alkaloid magnoflorine shows hypotensive as well as curare-like effect in animals.

Toddalia asiatica (Linn.) Lam.

Synonym ► *T. aculeata* Pers.

Family ► *Rutaceae.*

Habitat ► Tropical Himalayas, from Kumaon eastwards to Assam, Khasi hills and throughout the Western Peninsula.

English ► Wild Orange tree, Forest Pepper.

Ayurvedic ► Kanchana.

Siddha/Tamil ► Kattu Milagu, Milagaranai.

Folk ► Jangali Kaali-mirch, Kanja.

Action ► Whole plant—febrifuge, diuretic, Leaves—antispasmodic. Rootbark—antipyretic, diaphoretic, antiperiodic.

Used as a tonic during convalescence and constitutional debility. (The rootbark was used medicinally in the past in Europe under the name Lopez Root or Cortex Radicis as an antimalarial drug.)

Unripe fruits and roots are included in liniments used for rheumatism.

The rootbark contains alkaloids, including toddaline, toddalinine, skimmianine. The root gave coumarins, including toddanol, toddanone, toddasin, pimpinellin, iso-pimpinellin and toddalolactone.

Alkaloid toddaline is irritant to the mucous membrane, bronchi, intestines and the bladder.

Ethanolic extract of var. *obtusifolia* Gemble, found in the Nilgiris, Tamil Nadu, exhibited spasmolytic activity.

Among the coumarins, chlorocoumarin is the most important active principle and can be used an alternative for papaverine obtained from poppy.

T

Torenia travancorica Gamble.

Synonym ► *T. asiatica* Hook. f. in part, non Linn.

Family ► *Scrophulariaceae.*

Habitat ► Western Ghats in the Nilgiris, Madurai, Coimbatore and Tirunelveli. (Torenias are ornamental herbs.)

Folk ► Kakapu (Kerala).

Action ► Used in prescriptions for gonorrhoea.

Torenia polygonoides Benth. (North East India) is used in urinary tract infections, topically for aching joints, sores and ulcers. *T. thouarsii* Kuntze (coastal areas of Mysore) is used for ulcers.

Trachelospermum fragrans Hook. f.

Synonym ► *T. lucidum* (D. Don) K. Schum.

Family ► *Apocynaceae.*

Habitat ► Temperate and subtropical Himalaya from Kumaon to Arunachal Pradesh and in Assam, Meghalaya up to 2,100 m.

Folk ► Duudhi (Kumaon), Akhaahilataa (Assam).

Action ► Used as a substitute for *Alstonia scholaris.*

T. jasminoides Lem. (Star-Jasmine), native to China and Japan, is cultivated all over India. Alkaline extracts of the leaf and stem show activity against yeast. The leaves and twigs contain dambonitol, cyclitol, arctiin, tracheloside, beta-amyrin and its acetate, lupeol acetate, and a mixture of betastosterol, stigmasterol and campesterol. A flavone glycoside was isolated from the butanol extract of dried leaves

and several indole alkaloids from the alcoholic extract of dried leaves and twigs.

The leaves, stem and twigs are used for treating rheumatic arthritis, nervous disorders, urine retention and as a tonic for weak muscles or nerves.

Trachyspermum ammi (Linn.) Sprague.

Synonym ► *T. copticum* Link.
Carum copticum Benth. ex Hiern.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Cultivated in Madhya Pradesh, Andhra Pradesh, Gujarat, Maharashtra, Uttar Pradesh, Rajasthan and Bihar.

English ► Ammi, Lovage, Carum, Ajowan.

Ayurvedic ► Yavaani, Yamaani, Yavaanikaa, Yamaanikaa, Dipyaka.

Unani ► Nankhwaah, Desi Ajawaayin.

Siddha/Tamil ► Omam.

Action ► Fruits—carminative, antispasmodic, anticholerin, antidiarrhoeal, bechic, stimulant.

The Ayurvedic Pharmacopoeia of India recommends the dried fruits in tympanitis, constipation, colic and helminthiasis. Oil—used as an expectorant in emphysema, bronchial and other respiratory ailments.

Used externally in cases of rheumatism. Leaf juice—anthelmintic. Root—carminative, diuretic, febrifuge.

The aqueous extract of the fruit is a popular remedy for diarrhoea in Indian medicine.

The fruit, in addition to protein (17.1), fat (21.8), carbohydrates (24.6) and mineral matter (7.9%), contains sugars, tannins, flavone and sterol. The seeds contain a phenolic glucoside, 2-methyl-3-glucosyloxy-5-isopropyl phenol.

The principal constituents of the Ajowan oil are the phenols, mainly thymol (35–60%) and some carvacrol. (Crystalized thymol is known in the trade as Ajowan-kaa-phuul, Flower-of-Ajowan.)

Thymol is a powerful antiseptic and antifungal. It is an ingredient in deodorant mouth-washes, toothpastes and gargles. The aqueous portion, left after the separation of essential oil, is known as Omum-water and is prescribed in flatulence and gripe, especially in children.

Dosage ► Fruit—3–6 g powder. (*API,* Vol. I.)

Trachyspermum roxburghianum (DC.) Craib.

Synonym ► *Carum roxburghianum* (DC.) Benth. & Hk. f.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► Cultivated throughout India.

English ► Ajmud.

Ayurvedic ► Ajamodaa, Ajamoda, Ayamoda, Ajmoja, Dipyaka.

Unani ► Karafs-e-Hindi.

Siddha/Tamil ► Ashamtagam.

Action ► Seeds—carminative, stomachic, stimulant, cardiac tonic.

Used for dyspepsia, vomiting, hiccough, bronchitis, asthma, and pain in bladder; also as an emmenagogue.

The seeds yield the coumarins—bergaptene, 7-methoxy-6-methyl coumarin and umbelliferone. Beta-sitosterol is also reported.

Major constituent of the essential oil from the seeds are *d*-limonene (35.1), alpha-terpinene (19.4), *d*-linalool (4.7), *dl*-terpineol (5.7) and *dl*-piperitone (13.6%). Thymol content is 1.7%.

The fruit (Ajmud) induced hyperactivity of the central nervous system in mice. It also exhibited activity against *Entamoeba histolytica.* The ketonic substances exhibit powerful antispasmodic activity.

The fruit left after the extraction of the essential oil showed pronounced cardiotonic activity.

The oil produced marked diuretic effect in rabbits. It lowered blood pressure in dogs and rats.

Tragia involucrata Linn.

T

Family ► *Euphorbiaceae.*

Habitat ► Outer Himalayan ranges eastwards to Assam; southwards to Travancore, throughout warmer regions of India.

English ► Indian Stinging-Nettle.

Ayurvedic ► Vrishchhikaali, Vrishchhika-patrikaa. Used in Kerala as Duraalabhaa.

Siddha/Tamil ► Chenthatti, Sirrukanchori.

Action ► Root—febrifuge, diaphoretic, alterative, blood purifier. Given in fever when the extremities are cold; also for pain in arms and legs. Used as a blood purifier in venereal diseases; applied externally to skin eruptions. Fruit—paste used in baldness.

Dosage ► Whole plant—3–6 g. (*API,* Vol. IV.)

Tragopogon porrifolius Linn.

Synonym ► *T. sinuatum* Ave. Lall.

Family ► *Compositae; Asteraceae.*

Habitat ► Native to Europe; grown in Himachal Pradesh and Maharashtra.

English ► Salify, Vegetable-Oyster, Purple Goat's Beard, Oyster Plant.

Action ► Root—specific in obstructions of the gall in jaundice; antibilious. Also used for treating arteriosclerosis and high blood pressure.

T. porrifolius contain several flavonoids, including orientin and isoorientin.

The seeds yield an oil which contains a saturated epoxy acid viz. *cis*-9, 10-epoxysteric acid and several conjugated dienoic acids.

Cooked flashy roots of *T. porrifolius* contain sodium 8, potassium 183, calcium 60, magnesium 14, iron 1.2, copper 0.1, phosphorus 53, sulphur 25 and chlorine 46 mg/100 g. A large parts of carbohydrates occur as inulin.

Trapa bispinosa Roxb.

Synonym ► *T. natans* Linn. var. *bispinosa* (Roxb.) Makino. *T. quadrispinosa* Wall.

Family ► *Trapaceae.*

Habitat ► Throughout India.

English ► Water Chestnut.

Ayurvedic ► Shrngaataka, Shrngaata, Shrngamuula, Trikota, Jalaphala, Trikonaphala, Paaniyaphala, Jalkanda, Trikona, Trika.

Unani ► Singhaaraa.

Siddha ► Singara

Action ► *The Ayurvedic Pharmacopoeia of India* recommends the use of dried kernels in bleeding disorders, threatened abortion, dysuria, polyuria and oedema.

Flour of dried kernels is used in preparations for breaking fast in India. The flour is rich in proteins and minerals. The flour, prepared from dried kernels, of red and white varieties contain: phosphorus 45, 48; sulphur 122.81, 130.16; calcium 60, 20; magnesium 200, 160; sodium 100, 80; and potassium 1800, 1760 mg/100 g; iron 145.16, 129.02 and manganese 18.93, 11.36 ppm, respectively. The starch, isolated from flour, consists of 15% amylose and 85% amylopectin.

Dosage ► Dried seed—5–10 g powder. (*API*, Vol. IV.)

Trema orientalis Blume.

Synonym ► *T. amboinensis* auct. non Blume.

Family ► *Ulmaceae.*

Habitat ► Throughout India in humid regions, up to 2,430 m.

English ► Charcoal tree, Indian Nettle tree.

Siddha/Tamil ► Ambaratthi, Chenkolam.

Folk ► Gio.

Action ► Root—astringent and styptic; prescribed for diarrhoea, haematuria. Bark—analgesic.

Used as poultice for muscular pain. Root, bark and leaves—used in epilepsy.

The bark contains 16% tannin. Stembark gave triterpenoid alcohols simiarenol and tremetol; a triterpene simiurenone; octacosanoic acid and 1-octacosanyl acetate.

Alcoholic extract of the roots produced a progressive depression of blood pressure (a total of 50% in 1 h) in cats.

Trewia nudiflora Linn.

Family ► *Euphorbiaceae.*

Habitat ► Throughout moist and hot parts of India.

English ► False White Teak, Gutel.

Ayurvedic ► Shriparni, Tumri, Pindaara. Shriparni is a synonym of Gambhaari (Gmelina arborea).

Siddha/Tamil ► Attarasu, Nay Kumil.

Action ► Plant—antibilious, antiflatulent, bechic, anti-inflammatory. Root—carminative, antirheumatic.

Applied as poultice in gout and rheumatism. Plant extract showed antileukaemic activity.

Plant contains a pyridine alkaloid, N-methyl-5-carboxamide-2-pyridone. Leaves contain an alkaloid, nudiflorine.

Bark yields taraxerone and beta-sitosterol. Seeds contain an alkaloid ricinidine. The seeds also contain a maytansinoid compound, trewiasine (TWS). It exhibited significant cytotoxic activity against various human cell lines *in vitro*.

The charcoal made from the wood is rich in potassium (21.16%).

Trewia polycarpa Benth. ex Hook. f. (Western Ghats, Konkan and Kerala) is also a related species of Tumri.

Trianthema decandra Linn.

Family ▶ *Aizoaceae.*

Habitat ▶ South India, Gujarat, Rajasthan, Uttar Pradesh and Haryana.

Ayurvedic ▶ Varshaabhu (related species).

Siddha/Tamil ▶ Vellai Sharunnai.

Folk ▶ Bisakhaparaa.

Action ▶ Root—deobstruent; used for asthma, hepatitis and amenorrhoea. The root, leaf and stem gave positive test for alkaloid. The plant is a good source of zinc (1.077 ± 0.188) and copper (0.416 ± 0.057) mg/100 g.

Trianthema govindia Buch.-Ham ex G. Don.

Synonym ▶ *T. pentandra* auct. non *Linn.*

Family ▶ *Aizoaceae.*

Habitat ▶ The plains from Punjab to Bihar, extending southwards to Karnataka.

Ayurvedic ▶ Varshaabhu (related species).

Action ▶ Plant—astringent in stomach diseases, deobstruent, abortifacient.

The root and stems contain hentriacontane, hentriacontanol, beta-sitosterol glucoside, stigmasterol glucoside and nonacos-1-en-4-one.

Trianthema portulacastrum Linn.

Synonym ▶ *T. monogyna* Linn.

Family ▶ *Aizoaceae.*

Habitat ▶ Cultivated fields and wastelands.

English ▶ Horse Purslane.

Ayurvedic ▶ Varshaabhu, Vrshchira, Vishakharparikaa, Shilaatikaa, Shothaghni, Kshdra. Wrongly equated with Shveta-punarnavaa or Rakta-punarnavaa. Varshaabhu and Punarnavaa are two different herbs. *T. portulacastrum* is a rainy season annual. Rakta-punarnavaa is equated with *Boerhavia diffusa,* Shveta-punarnavaa with white-flowered species, *B. erecta* L. (*B. punarnava*).

Unani ► Biskhaparaa.

Siddha ► Sharunai.

Folk ► Pathari, Bisakhaparaa.

Action ► Root—antipyretic, analgesic, spasmolytic, deobstruent, cathartic, anti-inflammatory.

Leaves—diuretic; used in oedema and dropsy. A decoction of the herb is used as an antidote to alcoholic poison.

The Ayurvedic Pharmacopoeia of India recommends the dried root in diseases of the liver and spleen, anaemia and oedema.

Ethanolic extract of the aerial parts exhibited hepatoprotective activity in CCl4-induced intoxication in rats. The acetone-insoluble fraction of the extract is responsible for the activity.

The red and white flowers contain an alkaloid trianthemine, also punaranavine. The plant also gave ecdysterone (0.01 g/kg), a potential chemosterilant; nicotinic acid and ascorbic acid. The plant is rich in phosphorus and iron but poor in calcium.

The high content of oxalate affects the assimilation of calcium. Carotene (2.3 mg/100 g) has also been reported.

Trianthema sp. are used as adulterant of the roots of *Boerhavia diffusa*.

Dosage ► Root—2–5 g powder. (*API*, Vol. IV.)

Tribulus alatus Delile.

Family ► *Zygophyllaceae.*

Habitat ► Rajasthan, Gujarat, Punjab and Haryana.

English ► Winged Caltrops.

Ayurvedic ► Gokshura (related species).

Unani ► Gokharu-kalaan.

Folk ► Desi Gokharu, Aakharaa., Hasaka.

Action ► Fruits—diuretic, anti-inflammatory, emmenagogue. Used for uterine and genitourinary disorders.

Seed—astringent, diuretic; given to women to ensure fecundity.

The fruit gave sterols—stigmasterol, campesterol and beta-sitosterol; flavonoids—luteolin, kaempferol-3-glucoside and rutin; sapogenins—diosgenin, gitogenin and chlorogenin. Root, stems, leaves and seeds contain sapogenins—diosgenin, gitogenin and chlorogenin; sterols—beta-sitosterol and stigmasterol.

Tribulus terrestris Linn.

Family ► *Zygophyllaceae.*

Habitat ► Throughout India, up to 5,400 m.

English ► Land-Caltrops, Puncture Vine.

Ayurvedic ► Gokshura, Gokshuraka, Kshudra (Laghu) Gokharu, Shvadamshtraa, Swaadu-kantaka, Trikanta, Trikantaka. (Larger var. is equated with *Pedalium murex* Linn. The fruits of both the varieties are conical and have four spines, not three as the synonyms denote. Hence, *Acanthospermum hispidum* DC. and *Martynia annua* Linn. have

been suggested as the source of Trikantaka.)

Unani ► Khaar-e-Khasak Khurd.

Siddha ► Sirunenunji, Nerinjil, Nerunjil.

Action ► Fruits—diuretic, demulcent, anti-inflammatory, anabolic, spasmolytic, muscle relaxant, hypotensive, hypoglycaemic. Used in strangury, calculus affections, urolithiasis, crystalluria, urinary discharges, pruritus-ani, as a tonic in sexual inadequacy; also as a supporting medicine in cough and asthma. Leaf—diuretic, haemostatic. Root—stomachic, diuretic.

In addition to all these applications, *The Ayurvedic Pharmacopoeia of India* attributes cardiotonic properties to the root and fruit.

The plant contains saponins, which on hydrolysis yield sapogenins—diosgenin, gitogenin, chlorogenin, ruscogenin, 25D-spirosta-3, 5-diene, among others. Flavonoids—rutin, quercetin, kaempferol, kaempferol-3-glucoside and-rutinoside, and tribuloside have been isolated from the leaves and fruits. The seeds contain carboline alkaloids—harmane and harmine. Harmol is also reported from the herb.

A saponin (unidentified) is reported effective for treating angina pectoris in people with coronary heart disease (406 cases were treated). (*Natural Medicines Comprehensive Database*, 2007.)

Diuretic (more than furosemide), proerectile aphrodisiac, hypotensive, hypolipidaemic, hypoglycaemic (40–67% in diabetic mice) activities have been confirmed in several experimental studies. (*Pub Med, Medline* abstracts, 2003.)

Dosage ► Fruit—3–6 g powder. (*CCRAS.*)

Trichodesma indicum R. Br.

Family ► *Boraginaceae.*

Habitat ► The greater part of India in the plains.

Ayurvedic ► Adah-pushpi, Adhomukha, Gandhapushpika, Andhaka.

Siddha/Tamil ► Kalhudaitumbai.

Folk ► Andhaahuli.

Action ► Herb—Diuretic, emollient, febrifuge. Leaf—depurative. Root—anti-inflammatory, astringent, antidysenteric. Pounded and applied to swelling of joints. Flower—sudorific and pectoral.

The seeds gave linoleic, linolenic, oleic, palmitic and stearic acids. Hexacosane, ethylhexacosanoate, 21,24-hexacosadienoic acid ethylester have been isolated from the leaves.

Dosage ► Root—5–10 g paste. (*CCRAS.*)

Trichodesma zeylanicum R. Br.

Family ► *Boraginaceae.*

Habitat ► Peninsular India, crossing into West Bengal.

Ayurvedic ► Adah-pushpi (related species), Jhingi.

Folk ► Hetenuriyaa, Jalasirasa. Jinghini (Maharashtra).

Action ► Flower—sudorific, pectoral. Leaves—diuretic, emollient, demulcent. Root—applied to wounds as analgesic.

Seeds contain a toxic alkaloid supinine (1% dry seeds). Aqueous extracts of stems, leaves and fruits is very toxic to cockroaches.

Tricholepis angustifolia DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Coastal regions of Kerala and Karnataka.

Ayurvedic ► Brahmadandi (related species).

Folk ► Uuntakataaraa.

Action ► Diuretic, bechic.

Tricholepis glaberrima DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Rajasthan, Madhya Pradesh and Peninsular India.

Ayurvedic ► Brahmadandi.

Action ► Antiseptic (used in leucoderma), nervine tonic (used in seminal debility), urinary tract disinfectant. Root—bechic.

The plant contains betulin, spinasterol, stigmasterol, stigma-7-enol and a triterpenoid—cycloart-23-en-3beta, 25-diol.

Trichosanthes anguina Linn.

Family ► *Cucurbitaceae.*

Habitat ► Cultivated throughout India particularly in South India.

English ► Snake-Gourd.

Ayurvedic ► Dadhipushpi, Chichinda, Shvetaraaji, Ahiphala.

Siddha/Tamil ► Pudal.

Folk ► Chichindaa, Chichendaa.

Action ► Root and seed—antibilious, vermifuge, antidiarrhoeal. Fruits—improve appetite, cure biliousness.

Alpha-, beta-, gamma-carotenes, cryptoxanthin, lycopene, lutein, hentriacontane, ceryl alcohol, quercetin, alpha-amyrin, taraxerone, oxalic acid, surcose, and beta-sitosterol have been isolated from the fruit. The seed gave kaempferol, its 3-O-glucoside and quercetin.

The plant gave cucurbita-5,24-dienol, 24-ethylcholesta-7-enol, 24-ethylcholesta-7, 22-dienol.

Trichosanthes bracteata (Lam.) Viogt.

Synonym ► *T. palmata* Roxb. *T. lepiniana* (Naud.) Cogn. *Involucraria lepiniana* Naud.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India, in moist places.

Ayurvedic ► Indravaaruni (red var.), Vishaalaa, Mahaakaala, Mahendra-vaaruni.

Siddha/Tamil ► Korattai.

Folk ► Mahkaar, Maakaal, Laal Indraayana, Kondal.

Action ► Same as that of *Citrullus colocynthis.* The fruits are poisonous. The seed extract show haemagglutinating activity. Fruit—cathartic, antiasthmatic (the fruit is smoked in asthma and lung diseases), anti-inflammatory (used for rheumatic affections, weakness of limbs, dental diseases, hemicrania).

The root gave tetrahydroxypentacyclic triterpenoid, trichotetrol. Cyclotrichosantol and cycloeucalenol have been isolated from the leaves.

Trichosanthes cordata Roxb.

Family ► *Cucurbitaceae.*

Habitat ► Foot hills of the Himalayas from Garhwal to Sikkim and in north-eastern India, up to 500 m.

Ayurvedic ► Vidaari (var.), Bhuumikushmaanda, Patola (related species.).

Folk ► Bhui-kumhraa.

T

Action ► Tuber—dried powder given in enlarged spleen and liver; applied externally on leprous ulcers.

Used in prescriptions for haemorrhagic diseases and in spermatopoietic tonics. Aerial parts—diuretic.

The seeds yield 23.3% (dry basis) a fatty oil containing 32.3% of punicic acid.

Trichosanthes cucumerina Linn.

Family ► *Cucurbitaceae.*

Habitat ► Found throughout India in scrub-jungles and waste places.

Ayurvedic ► Amritaphala, Vana-Patota, Tikta-Patoli.

Siddha ► Kattu Pey Pudal.

Action ► Bitter fruits—blood purifier (used in the treatment of skin diseases); germicidal; appetizer, laxative (used in bilious disorders); hepatoprotective. Root and seed—anthelmintic, antifebrile. Whole plant—antipyretic. Root—cathartic. Leaves—used externally in alopecia.

Cucurbitacin B has been isolated from the fruits.The root tuber contains glycoproteins and beta-trichosanthin.

The leaves gave luteolin-7-glucoside, kaempferol, 3,7-dirhamnoside and 3-glucoside-7-rhamnoside, cucurbitacins B and E, oleanolic acid, beta-sitosterol and its D-glucoside. The seed oil showed the presence of punicic acid; oleic, linoleic, eleostearic, palmitic, stearic and arachidic acids. Meso-inositol was found to be present in the plant.

Trichosanthes dioica Roxb.

Family ► *Cucurbitaceae.*

Habitat ► Warmer regions of India, particularly in Uttar Pradesh. Bihar, West Bengal and Assam.

English ► Patol, Pointed Gourd.

Ayurvedic ► Patola, Kulaka, Raajiphala, Karkashchhada, Karkasha, Bijagarbha.

Unani ► Parwal.

Siddha ► Kommu Patolia.

Action ► Aerial parts—hypoglycaemic. Fruits—juice of unripe fruits used in spermatorrhoea. Leaves—febrifuge; prescribed as a diet in enlargement of liver and spleen; piles and fistula. Root—cathartic, febrifuge.

The fruits contain free amino acids, nicotinic acid, riboflavin, vitamin C, thiamine, 5-hydroxytryptamine. Mature plant and root gave cucurbita-5, 24-dienol. Colocynthin, trichosanthin, hentriacontane have been isolated from the root.

Fatty acids from the seeds comprise elaeostearic, linoleic, oleic and saturated acids.

The whole fruit and pulp produced significant hypocholesterolaemic, hypotriglyceridaemic and hyper-phospholipidaemic effects in normal and midly diabetic human subjects.

Extracts of seeds exhibit haemagglunating activity.

Dosage ► Leaf—10–2 ml juice. (*CCRAS*.)

Trichosanthes nervifolia Linn.

Family ► *Cucurbitaceae.*

Habitat ► Karnataka, Kerala and Tamil Nadu.

Ayurvedic ► Patoli (related species of Patola).

Siddha/Tamil ► Kombu Pudalai.

Action ► Herb—bitter tonic, febrifuge. Root—purgative. Fruit—used as dentifrice.

Tridax procumbens Linn.

Family ► *Asteraceae; Compositae.*

Habitat ► Waste places, road sides and hedges throughout India.

English ► Mexican Daisy.

Ayurvedic ► Jayanti (doubtful synonym).

Siddha/Tamil ► Vettukkaaya-thalai.

Folk ► Akala Kohadi (Bihar).

Action ► Leaves—styptic, antidiarrhoeal, antidysenteric. Also used for bronchial catarrh.

The leaf juice exhibits antiseptic, insecticidal and parasiticidal properties. It is used to check haemorrhage from wounds, cuts and bruises, also for restoring hair growth.

An aqueous extract of the plant produced reflex tachycardia and showed a transient hypotensive effect on normal blood pressure of dogs; it had also showed a marked depressant action on the respiration.

Alcoholic extract of the whole plant (excluding roots) at a dose of 300 mg showed good anti-secretory antidiarrhoeal activity against *E. coli* enterotoxin-induced secretory response in rabbit and guinea-pig ileal loop models. Alcoholic extract of aerial parts also showed hepatoprotective action against acute hepatitis induced by CCl4 in albino rats.

The leaves contain fumaric acid. The plant gave *n*-alkanes, saturated and unsaturated fatty acids along with dotriacontanol, beta-amyrin, beta-amyrone, lupeol, fucosterol and beta-sitosterol. Flowers contain glucoluteolin, isoquercetin and quercetin. Presence

of lauric, myristic, palmitic, stearic, arachidic, behenic, palmitoleic, linoleic and linolenic acid is reported in aerial parts except flower tops.

Trifolium pratense Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Kashmir to Garhwal at 1,200–2,400 m, and the Nilgiris.

English ► Red Clover.

Unani ► Ispast, Berseem, Clover (equated with *T. alexandricum* Linn.)

Folk ► Trepatra (Punjab).

Action ► Flower—deobstruent, antispasmodic, expectorant, sedative, anti-inflammatory, antidermatosis.

Used for psoriasis, eczema and other skin diseases; and as an expectorant in coughs and bronchitis. Also used as antineoplastic against tumours and hard swellings.

The plant contains *iso*-flavonoids—calycosin-7-galactoside, calycosin, pseudobaptigenin, fornononetin, diadzein and medicagol; also hydroxypterocarpans.

The flowerheads contain phenolic glycosides, flavonoids, salicylates, coumarins, cyanogenic glycosides, starch and fatty acids. Flavonoids in the flowers and leaves are oestrogenic; provide relief in menopausal complaints.

The British Herbal Pharmacopoeia recognizes anti-inflammatory property of the flower.

Trifolium alexandricum, according to *National Formulary of Unani Medicine,* is used as Ispast. The seeds contain xanthosin.

Trigonella corniculata Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Kashmir to Sikkim, and in Bihar and West Bengal. Cultivated in North India.

Unani ► Pirang.

Folk ► Kasuri Methi, Maarwaari Methi, Champaa Methi.

Action ► Leaves—rich in phosphorus. Fruits—bitter, astringent and styptic. Applied to swellings and bruises.

The seeds afforded ethyl-alpha-D-galactopyranoside, glycoflavones—vitexin (apigenin-C-glucoside), apigenin-6-8-*di*-C-monoglucoside and its monoacetate; also contain triacontane, 22,23-dihydrostigmasterol, choline and betaine; saponins on hydrolysis gave yuccagenin and diosgenin.

Trigonella foenum-graecum Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Widely cultivated in many parts of India.

English ► Fenugreek.

Ayurvedic ► Methikaa, Methi, Vastikaa, Selu, Methini, Dipani, Bahupatrikaa, Bodhaini, Gandhaphala.

Unani ► Hulbaa, Methi.

Siddha/Tamil ► Vendhayam.

Action ► Seeds—used in loss of appetite, flatulence, dyspepsia, colic; diarrhoea, dysentery; enlargement of liver and spleen; and as a lactagogue and puerperal tonic.

Key application ► *German Commission E* reported secretolytic, hypermic and mild antiseptic activity of the seed. *The British Herbal Pharmacopoeia* reported its actions as demulcent and hypoglycaemic. *ESCOP* and *WHO* monographs indicate the use of seeds in adjuvant therapy for diabetes mellitus, anorexia, also in hypercholesterolaemia.

The seeds gave alkaloids, including trigonelline, gentianine and carpaine; saponins, based mainly on the sapogenins, diosgenin and its isomer yamogenin, gitogenin and tigogenin; flavonoids, including vitexin and its glycosides and esters and luteolin; a volatile oil in small quantities. The mucilage (25–30%) is mostly a galactomannan.

A C-steroidal sapogenin peptide ester, fenugreekine, exhibited hypoglycaemic activity.

About 80% of the total content of free amino acids in the seeds is present as 4-hydroxyisoleucine, which appears to directly stimulate insulin. (*Eur J Pharmacol,* 390, 2000; *Natural Medicines Comprehensive Database,* 2007.)

Saponin rich extracts reduce blood levels of the cholesterol. The fibrous fraction of seeds also causes a reduction in blood lipids.

The aqueous extract is demulcent, promoted healing of gastric ulcers produced experimentally in rats and exhibited a smooth muscle relaxing effect in rabbits without affecting either the heart or blood pressure.

Fenugreek has been reported to stimulate the liver microsomal cytochrome P450 dependent aryl hydroxylase and cytochrome b5 in rats; increased bile secretion has also been observed.

Fenugreek extract containing trigonelline and trigonellic acid may be used as a hair growth stimulant.

Dosage ► Seed—3–5 g powder. (*CCRAS.*)

Trigonella incisa Benth.

Synonym ► *T. polycerata* auct. non L.

Family ► *Papillionaceae; Fabaceae.*

Habitat ► Punjab plains and Western Himalaya, up to 1,800 m.

Folk ► Sainji, Chini, Shirgona (Punjab), Chainhari (Delhi), Methi (related species).

Action ► Seeds—antidiarrhoeic.

Aerial parts and pods contain steroidal sapogenins—diosgenin 0.04, 0.25; and tigogenin 0.008, 0.18% respectively.

Various plant parts and tissues in culture contain flavonoids, the major being luteolin, besides kaempferol, quercetin and apigenin.

Trigonella uncata Boiss.

Family ► *Papilionaceae, Fabaceae.*

Habitat ► Afghanistan, Persia.

English ► Tonkin Bean, Melilot, King's Crown.

Unani ► Iklil-ul-Malik (also equated with *Melilotus alba* Desv., and *Astragalus homosus* Linn.).

Folk ► Sainji (white-flowered var.).

Action ► Beans—anti-inflammatory, anodyne, diuretic, emmenagogue.

(Indian species, bearing smaller beans, has been equated with *Trigonella corniculata* and is known as Pirang.)

Triphasia trifolia (Burm. f.) P. Wils.

Family ► *Rutaceae.*

Habitat ► Wild in parts of Peninsular India; cultivated in gardens.

English ► Lime Berry, Myrtle-Lime, Chinese Lime.

Folk ► Chinese Naarangi.

Action ► Leaves—used in skin diseases and in preparation of bath salts. Ripe fruits—used against cough.

The leaves contain the alkaloid O-methylhalfordinol and coumarins, including umbelliferone, isomeranzin and triphasiol.

Triticum aestivum Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Cultivated as a food crop mainly in Punjab, Haryana, Uttar Pradesh., Madhya Pradesh, Maharashtra, Bihar and Rajasthan.

English ► Wheat.

Ayurvedic ► Godhuuma.

Folk ► Gehun.

Action ► Wheat germ oil is rich in tocopherol (vitamin E) content, total tocopherols 1897 mcg/g, alpha tocopherol 67%. The presence of ergosterol (provitamin D) has also been reported.

Wheat germ is also used for its minerals, proteins and lipid contents. Germ proteins are rich in lysine (5.28–5.55 g/100 g protein) and possess high biological value (94%) and protein efficiency ratio (2.9).

Wheat germ contains haemagglutinating and antipyretic factors, but these are destroyed by toasting. It also contains haemoproteins, possessing peroxidase activity.

In adult rats, addition of wheat germ (7%) to a high fat (cholesterol) diet significantly decreased VLDL-cholesterol and VLDL-triglycerides and increased the HDL-cholesterol after-7 weeks of feeding.

Bran oil contains tocopherols, but major part of them (68%) is in epsilon form; alpha-tocopherol forms only 11% of the total.

Gluten lipids, associated with gluten, contain a high percentage of linoleic acid; lowering of serum cholesterol level has been observed in experiments (lipid-free gluten is devoid of cholesterol-lowering effect).

Sensitivity to gluten has also been reported (even when whole wheat flour was used).

Triumfetta rhomboidea Jacq.

Synonym ► *T. angulata* Lam.

Family ► *Tiliaceae.*

Habitat ► Throughout tropical and subtropical India, up to 1,200 m in the Himalayas.

English ► Burbush, Burweed.

Ayurvedic ► Jhinjhireetaa, Gippit.

Siddha/Tamil ► Ottupullu.

Folk ► Chikti, Biriyaaraa.

Action ► Leaves and bark—astringent, anticholerin, demulcent. Used in diarrhoea and dysentery. Root—styptic, diuretic, galactogenic. Hot infusion facilitates childbirth and hastens parturition. Pounded roots are given for the treatment of ulcers. Leaves and flowers—used against leprosy.

T. rotundifolia Linn., known as Mudappondu in Tamil Nadu and Bankitutturi in Andhra Pradesh and Karnataka, is used as a demulcent. Alcoholic extract of the root showed anti-inflammatory activity and reduced cotton pellet granuloma formation in albino rats. Alcoholic extract of the whole plant exhibited antimicrobial activity.

Tropaeolum majus Linn.

Family ► *Tropaeolaceae.*

Habitat ► Native to South America; grown as an ornamental and salad herb.

English ► Garden Nasturtium, Indian Cress, Climbing-Nasturtium.

Action ► Leaves—an infusion increases resistance to bacterial infections, reduces catarrh formation and expels phlegm. Juice of the plant—given internally for treating scrofula. Flowers—used for healing wounds. Seeds— purgative.

Common Nasturtium contains glucocyanates (including glycotropeoline), spilanthol, myrosin (an enzyme), oxalic acid and vitamin C. The leaves from the young plant showed greater antibiotic activity than the stems; roots were inactive.

Extracts and preparations of *T. majus* are found efficacious in the infections of urinary and respiratory tract, but have no effect on infections of the biliary tract or in typhoid fever.

Tulipa gesneriana Linn.

Family ► *Liliaceae.*

Habitat ► Western Himalayas at altitudes of 1,500–2,400 m.

English ► Common Garden Tulip, Late Tulip. Tulip tree is equated with *Liriodendron tulipifera.*

Unani ► *Tulipa stellata* Hook bulbs are wrongly equated with Suranjaan of Unani medicine. *Colchicum luteum* Baker is the source of Suranjaan Talkh (bitter), and *Merendera persica* of Suranjaan Shireen (sweet).

Folk ► Tulip.

Action ► Bulbs—mitogenic (TG lectin-erythrocyte, and TG lectin-yeast).

A cardiotoxic alkaloid has been reported from the leaves. Antibiotic D-glucosides (tuliposides), inhibit the growth of *Bacillus subtilis,* have been isolated from pistils, stalks and leaves.

Turnera ulmifolia Linn.

Synonym ► *T. angustifolia* Mill.

Family ► *Turneraceae.*

Habitat ► West Bengal and Orissa and in the Peninsular India, particularly on the coast.

English ► West Indian Holly, Sagerose.

Folk ► Bhinjir (Maharashtra).

Action ► Herb—prescribed in indigestion, biliousness (leaves are used against dysentery), chest ailments and rheumatism.

The fresh plant yields a mixture of cyanohydrin glucosides—deidaclin and tetraphyllin. Seeds, along with normal fatty acids, contain a few unusual fatty acids, including vernolic, malvalic and octanoic acids.

An allied species *Turnera diffusa* var. *aphrodisiaca,* a native to the Gulf of Mexico, Southern California, (known as Damiana) is used in India by homoeopathic practitioners as a tonic and sex restorative, and for treating premature ejaculation.

Turnera diffusa Willd. has been included among unapproved herbs by *German Commission E. The British Herbal Pharmacopoeia* recognizes its thymoleptic activity.

Turraea villosa Benn.

Family ► *Meliaceae.*

Habitat ► Gujarat to Karnataka, both on the hills and the coasts, and in the Anamalai Hills in Tamil Nadu up to 1,200 m.

Folk ► Pandre, Kapuur—bhendi (Maharashtra).

Action ► Root—applied to fistula; also administered in leprosy.

Villosterol, a pregnene steroid, has been isolated from the plant.

T. virens Linn. (Kerala) is reported to be employed in the treatment of fits.

Tussilago farfara Linn.

Family ► *Compositae; Asteraceae.*

Habitat ► Western Himalayas from Kashmir to Nepal at 1,500–3,500 m.

English ► Coughwort, Coltsfoot, Asses' Foot.

Unani ► Fanjiyun.

Action ► Leaves and flowers—anticatarrhal, antitussive, expectorant, antispasmodic, demulcent, anti-inflammatory. Used for dry, unproductive, irritative cough, smoker's cough, whooping cough, bronchial asthma (effect short-lived), laryngitis.

Key application ▶ In acute catarrh of the respiratory tract with cough and hoarseness; acute, mild inflammation of the oral and pharyngeal mucosa. Contraindicated during pregnancy and nursing. (*German Commission E.*)

The leaves and flowers contain flavonoids including rutin, hyperoside and isoquercetin; pyrrolizidine alkaloids including senkirkine and tussilagine (about 0.015%); mucilage (about 8%) consisting of polysaccharides based on glucose, galactose, fructose, arabinose and xylose; inulin, tannins.

Polysaccharides are anti-inflammatory and immuno-stimulating, as well as demulcent. Flavonoids also have anti-inflammatory and antispasmodic action. Pyrrolizidine alkaloids have caused hepatotoxicity in rats fed daily on high doses, but not on daily low dose regimes. These are largely destroyed when the herb is boiled.

The leaf contains an inhibitor of platelet activating factor (PAF). The PAF inhibitor can account for Coltsfoot's efficacy in asthma. The constituent, tussilagone has respiratory stimulant and cardiovascular (including pressor) activities. In animal studies, Coltsfoot is reported to have a pressor effect similar to dopamine but without tachyphylasis. (*Natural Medicines Comprehensive Database,* 2007.)

Tylophora fasciculata
Buch.-Ham ex Wight.

Family ▶ *Asclepiadaceae.*

Habitat ▶ Sub-Himalayas tract from Uttar Pradesh to Meghalaya and in central and Peninsular India.

Ayurvedic ▶ Go-chandanaa.

Action ▶ Toxic. Used as a substitute for Cephaelis ipecacuanha as emetic, purgative and febrifuge; externally on unhealthy ulcers and wounds.

Tylophora indica
(Burm. f.) Merrill.

Synonym ▶ *T. asthamatica* Wight & Arn.

Family ▶ *Asclepiadaceae.*

Habitat ▶ Assam, West Bengal, Orissa and Peninsular India.

English ▶ Emetic Swallow Wort, Indian or Country Ipecacuanha.

Ayurvedic ▶ Antamuula, Muulini, Arkaparni.

Siddha/Tamil ▶ Nay Palai, Nangilaippiratti.

Action ▶ Leaves—used for bronchial asthma and allergic rhinitis.

The whole plant yielded alkaloids including tylophorine, tylphorinine, desmethyltylophorine and desmethyltylophorinine, and a flavonoid kaempferol. The root yielded alkaloids, tylophorinidine and gamma-fagarine. The leaves gave tylophorinidine, *d*-septicine, *d-iso*-tylocrebrine; triterpenoids alpha-and beta-amyrin; beta-sitosterol, stigmasterol and campesterol; phenylalanine; and quercetin. Ceryl alcohol has also been reported from the plant.

The plant exhibited anti-amoebic activity against axenic and polyaxenic strains of *Entamoeba histolytica*. Tylophorine and 4-methoxy-14-hydroxytylophorine are 2 and 4 times more effective, respectively, than the standard drugs Emetine dihydrochloride and Metroindazole. Tylophorine is found effective in intestinal as well as hepatic amoebiasis in test animals, but its gross toxicity excludes its potential use in humans.

Tylophorine also exhibits anti-inflammatory and anti-tumour properties.

Desmethyltylophorine gave promising results in leukaemia.

The drug irritates the digestive tract.

Tylophora tenuis Blume

Synonym ▶ *T. tenuissima* (Roxb.) W. & A.

Family ▶ *Asclepiadaceae.*

Habitat ▶ Tamil Nadu up to 2,100 m, and along the back waters in Kerala and West Bengal.

Folk ▶ Nanjaruppan (Tamil Nadu, Kerala).

Action ▶ Plant—alexipharmic; used for the treatment of urticaria, smallpox, excessive perspiration, biolious swellings, as an antidote to arsenic poisoning. Leaves—used for scabies.

Typha australis Schum. & Thonn.

Synonym ▶ *T. angustata* Bory & Chaub.

Family ▶ *Typhaceae.*

Habitat ▶ Throughout India, up to an altitude of 1,730 m.

English ▶ Lesser Indian Reed-Mace.

Ayurvedic ▶ Gundra, Gundraa, Gundraka, Guntha. (Gundraa has also been interpreted as Bhadramustaa, *Cyperus rotundus* Linn.)

Siddha/Tamil ▶ Sambu.

Folk ▶ Pater, Gondapateraa.

Action ▶ Rhizomes—astringent and diuretic. Spikes—ash is used for healing wounds. The pollen, mixed with honey, is applied to wounds and sores or taken internally for treating uterine bleeding and haematuria.

The plant contains isorhamnetin, pentacosane and sterols. A flavonol glucoside, yielding quercetin on hydrolysis, has been reported in the plant.

Dosage ▶ Rhizome—50–100 ml decoction. (*CCRAS.*)

Typha elephantina Roxb.

Family ▶ *Typhaceae.*

Habitat ▶ Kashmir and from Uttar Pradesh to Assam, in stagnant, fresh and brackish-water.

English ▶ Elephant Grass, Bulrush, Indian Reed-Mace.

Ayurvedic ▶ Gundra, Gundraa, Gundraka, Potagala. (related species of T. australis.)

Siddha/Tamil ▶ Anai Korai, Chambu.

Folk ► Gondapateraa.

Action ► Rhizomes—astringent and diuretic; used for dysentery. Pollen—used for internal and external bleeding; uterine bleeding, blood in urine, nose bleeds.

The herb contains isorhamnetin, pentacosane and plant sterols.

Typha laxmanni Lepech.

Family ► *Typhaceae.*

Habitat ► Kashmir (Gilgit), at 2,700 m.

English ► Scented Flag.

Ayurvedic ► Airakaa.

Folk ► Pizh (Kashmir).

Action ► Stamens—astringent and styptic. Used externally.

Typhonium trilobatum (L.) Schott.

Family ► Araceae.

Habitat ► Peninsular India, and from Yamuna eastwards; also grown in South India.

Siddha/Tamil ► Karu Karunai Kizhangu, Karunai Kizhangu.

Action ► Tuber—applied as poultice on scirrhous tumours (fresh tuber is very acrid and a powerful stimulant). Eaten with bananas, the tubers relax the bowels and provide relief in haemorrhoids (tubers become innocuous on heating or drying).

The tubers contain carotene, folic acid, niacin, thiamine, sterols and beta-sitosterol.

U

Ulmus wallichiana Planch.

Family ► *Ulmaceae.*

Habitat ► The North Western Himalayas.

English ► Himalayan Elm. Slippery Elm is equated with *Ulmus fulva.*

Folk ► Hemar, Kitamaara.

Action ► Bark—astringent, demulcent, emollient, expectorant, diuretic.

The bark contains 0.76% tannins.

Ulmus fulva Michx, though known as Indian or Sweet Elm, is an American plant and does not occur in India.

Powdered bark of *Ulmus fulva* gives a mucilage, composed of galactose, 3-methyl galactose, rhamnose and galacturonic acid residues. As a gruel it is prescribed for patients with gastric or duodenal ulcers. Coarse powdered bark is applied as poultice to burns and skin eruptions.

The mucilages cause reflex stimulation of nerve endings in the GI tract and lead to mucous secretion which protects the GI tract against ulceration and excess acidity. (*Natural Medicines Comprehensive Database,* 2007.)

Uncaria gambier Roxb.

Family ► *Rubiaceae.*

Habitat ► Malaysia and Indonesia.

English ► Pale Catechu, Gambier.

Ayurvedic ► Khadira (related species).

Folk ► Chinai Katthaa.

Action ► Intestinal astringent. Uses similar to Black Catechu (Acacia catechu). The extract of the leaves and shoots contains tannins, mainly catechins up to 35% and catechu tannic acid up to 50%; indole alkaloids including gambirine, gambiridine; flavonoids such as quercetin; pigments and gambirfluorescin.

Gambirine is reported to be hypotensive; *d*-catechu constricts blood vessels. Catechins protect the liver from infection.

A related species, *U. rhynchophylla,* native to China, known as Gou Teng in Chinese medicine, is used for eclampsia, headache,

dizziness, convulsions, high fever and hypertension. (*WHO.*)

Unona desmos Raeusch.

Synonym ► *Desmos cochinchinensis* Lour.

Family ► *Annonaceae.*

Habitat ► Assam.

Action ► Root—febrifuge.

The roots contain a desmoflavone. A cycloartane triterpenoid desmosinol has been isolated from stem. The root

of *U. discolor* Vahl, synonym *Desmos chinensis* Lour. (forests of north-east, south and west India) is given for vertigo.

The root contains a flavonoid desmal. Desmal inhibited tyrosine kinase *in situ* in epidermal growth factor (EGF) receptor overexpressing NIH3T3 (ERIZ) cells. It also inhibited EGF-induced inositol phosphate formation and morphological changes.

Uraria alopecuroides Wight.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Grasslands and forest-glades from Uttar Pradesh to Assam and in Orissa, Andhra Pradesh and Karnataka.

Ayurvedic ► Prishniparni (related species).

Action ► Pods and roots—used against ringworm.

Uraria crinita Desv.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Throughout Himalayas, up to an altitude of 2,700 m and in Khasi, Aka and Lushai hills.

Ayurvedic ► Prishniparni (related sp.).

Action ► Prescribed in dysentery, diarrhoea; enlarged spleen and liver; also for the treatment of pustules, tumours and fistula.

Uraria lagopoides DC.

Synonym ► *U. lagopodioides* Desv.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Grasslands of Bihar, Orissa, West Bengal and Palni Hills.

Ayurvedic ► Prishniparni. (Prishniparni and Shaaliparni are used together in Indian medicine. Both have been equated with *Uraria* sp., *U. lagopoides* and *U. picta*.

Siddha ► Moovilai.

Action ► Whole plant—anticatarrhal and alterative. Root—used in prescriptions for intermittent fevers, pulmonary inflammation and as a recuperating tonic. Leaves—prescribed in diarrhoea.

Flavonoids, including 5-hydroxy-7, 4′-dimethoxy flavonol, have been isolated from the plant.

The plant is mentioned as an abortifacient in ancient Ayurvedic texts. Hot aqueous extract of the shoots showed oxytocic activity on both gravid and non-gravid uteri of experimental animals. The aqueous extract of the plant shows anti-implantation activity on rats and spasmogenic effect on the guts of rabbits and uteri of rats.

Uraria picta Desv.

Synonym ► *Hedysarum pictum* Jacq.

Family ► *Papilionaceae*; *Fabaceae*.

Habitat ► Throughout India, in dry grasslands.

Ayurvedic ► Prishniparni, Prithakparni, Simhapushpi, Kalashi, Dhaavani, Guhaa, Chitraparni.

Siddha/Tamil ► Oripai.

Action ► Root—prescribed for cough, chills and fevers. Leaves—antiseptic, used for urinary discharges and genitourinary infections.

The Ayurvedic Pharmacopoeia of India recommends a decoction of whole plant in alcoholism, insanity, psychosis; cough, bronchitis, dyspnoea; diseases due to vitiated blood; gout; bleeding piles; blood dysentery, acute diarrhoea.

The plant is credited with fracture-healing properties. Its total extract exhibits better and quicker healing of fractures in experimental animals due to early accumulation of phosphorus and more deposition of calcium.

Dosage ► Whole plant—20–50 g powder for decoction. (*API,* Vol. IV.)

Urena lobata Linn. Mast.

Family ► *Malvaceae.*

Habitat ► Throughout warmer parts of India, frequent in West Bengal.

Ayurvedic ► Naagabalaa (Grewia hirsuta and Sida veronicaefolia are also equated with Naagabalaa). Used as Balaa in Kerala.

Siddha/Tamil ► Ottatti.

Action ► Root—diuretic, emollient, antispasmodic (roots and stem used in severe windy colic), antirheumatic. Flowers—used as a pectoral and expectorant in dry and inveterate coughs. An infusion is used as a gargle for aphthae amd sore throat.

The aerial parts gave magniferin and quercetin. Alkanes, stigmasterol and beta-sitosterol are reported from the whole plant. The seeds contain protein, pentosan and mucilage.

Urena lobata Linn. var. sinuata King.

Synonym ► *U. sinuata* Linn.

Family ► *Malvaceae.*

Habitat ► Throughout the warmer parts of India.

Ayurvedic ► Used as a substitute for Balaa.

Siddha/Tamil ► Ottatti.

Folk ► Lot-loti, Kunjuyaa.

Action ► Leaves—used in inflammation of intestines and bladder. Flowers—an infusion is used in bronchitis. Root—emollient and refrigerant. Used in external application for lumbago and rheumatism.

Urginea indica (Roxb.) Kunth.

Synonym ► *Drimia indica* Roxb. non-(Wt.) Baker.

Family ► *Liliaceae.*

Habitat ► Western Himalayas, Bihar, Konkan and along the Coromandel Coast. *U. maritima* (L.) Baker is native to Mediterranean region.

English ► Indian Squill, Sea Onion (red and white varieties).

Ayurvedic ► Vana-palaandu, Kolakanda, Vajrakanda.

Unani ► Unsul-e-Hindi, Isqueel-e-Hindi, Piyaaz-Dasti, Piyaaz-Sahraayi, Jangali Piyaaz.

Siddha/Tamil ► Narivengayam.

Action ► Used as a substitute for European Squill, *Urginea maritima*. Expectorant (in dry respiratory conditions, whooping cough and bronchial asthma), antispasmodic, emetic (in large doses), diuretic (promotes fluid elimination in heart disease), cardiac tonic (effect, non-cumulative). Used topically as a hair tonic for dandruff and seborrhoea (active constituent is thought to be scilliroside of the Red Squill.)

Key application ► *Urginea maritima*—in milder cases of heart insufficiency, also for diminished kidney capacity. (*German Commission E.*)

Bulbs contain cardiac glycosides, scillarens A and B. Bulb, leaves and root contain stigmasterol, sitosterol and campesterol. Bulbs also contain hentriacontanol, octacosanoic acid. Defatted air-dried bulbs afforded 6-desacetoxyscillirosidin.

The plant exhibits cyanogenetic activity.

Urginea maritima (White Squill) is contraindicated in potassium deficiency or when digitalis glycosides are being used (Francis Brinker), in hypercalcaemia and hyperkalaemia (Sharon M. Herr).

Urginea coromandeliana Hook. f. non-Wight, synonym *U. wightiana* Hook f. (Coromandel coast and in dry regions of Andhra Pradesh and Tamil Nadu up to 3,000 m) is used as a substitute for Indian Squill *(U. indica)*.

Dosage ► Bulb—120–200 mg powder. (*CCRAS.*)

U

Urtica dioica Linn.

Family ► *Urticaceae.*

Habitat ► North-western Himalaya from Kashmir to Simla at 2,400–3,600 m.

English ► Stinging Nettle.

Ayurvedic ► Vrishchhiyaa-shaaka (related species).

Unani ► Anjuraa.

Folk ► Shisuun (Kumaon).

Action ► Plant—diuretic, astringent, antihaemorrhagic; eliminates uric acid from the body, detoxifies the blood. Externally, astringent and haemostatic.

Used internally for the treatment of nephritis, haemoptysis and other haemorrhages.

Key application ► Above ground parts—as a supportive therapy for rheumatic ailments (internally and externally). Internally, in irrigation therapy for inflammatory diseases of the lower urinary tract and prevention and treatment of kidney gravel. (*German Commission E, ESCOP, The British Herbal Compendium, The British Herbal Pharmacopoeia.*) Root—in symptomatic treatment of micturition disorders (dysuria, pollakiuria, nocturia, urine retention) in benign prostatic hyperplasia at

stages I and II. (*German Commission E, ESCOP, WHO, The British Herbal Pharmacopoeia.*)

Clinical experiments have confirmed the utility of the herb as a haemostatic in uterine haemorrhage and bleeding from nose. The herb is also used in sciatica, rheumatism and palsy. The treatment for paralysis comprises slapping the patient with a bundle of twigs. Alcoholic extract of *Russian* sp. is used in the cholecystitis and habitual constipation.

The root exhibits an antiproliferative effect on prostatic epithelial and stromal cells. It may also lessen the effects of androgenic hormones by competitively blocking acess to human sex hormone binding globulin. (*Planta Med,* 63, 1997; *ibid*, 66, 2000. Also, *ESCOP* monograph; *Altern Complem Ther,* 1998; Simon Mills; *Natural Medicines Comprehensive Database,* 2007.)

In Europe, the juice of the leaves or roots, mixed with honey or sugar, was prescribed for bronchial asthma. In the USA, a freeze-dried preparation of the herb (300 mg gelatin capsules) has been found to improve condition of allergic rhinitis patients. The powdered seeds were considered a cure for goitre. (M. Grieve.)

The urticating properties of the hairs are attributed to the presence of acetylcholine, histamine and 5-hydroxytryptamine (5-HT). A histamine-liberating enzyme is also present.

Acetylcholine is present in the leaves, rootlets, rhizomes and cortex in the ascending order of concentration. Histamine is not present in the underground parts of the plant. Its concentration in the leaves is about four times than that in the stem-cortex. Betaine and choline are present in the leaves.

The leaves gave flavonoids (including rutin), sterols, carotenoids, vitamins (including C, B group, K), minerals, plant phenolic acids. The coumarin scopoletin has been isolated from the flowers and the root.

A polysaccharide fraction obtained from aqueous extract showed anti-inflammatory activity in carrageenan-induced rat paw oedema and lymphocyte transformation test. A lectin was found to stimulate proliferation of human lymphocytes. (*Planta Med,* 55, 1989.)

The leaf and root is contraindicated in kidney disease and pregnancy. 5-hydroxytryptamine is a uterotropic constituent. (Francis Brinker.)

Urtica parviflora Roxb.

Family ► *Urticaceae.*

Habitat ► Temperate Himalayas and the Nilgiris.

Ayurvedic ► Vrishchhiyaa-shaaka.

Folk ► Shisuun (Kumaon).

Action ► Roots—employed for the treatment of fractures and dislocations. Leaves and inflorescences—prescribed as a tonic and as a cleaning agent after parturition.

Urtica pilulifera Linn.

Family ► *Urticaceae.*

U

Habitat ► Simla and other hill stations.

English ► Roman Nettle.

Ayurvedic ► Used as a substitute for Vrishchiyaa-shaaka.

Unani ► Anjuraa.

Action ► Diuretic, astringent, haemostatic.

The leaves and stems contain an indole alkaloid, bufotenin. 5-hydroxytryptamine is located mainly in strings.

Urtica urens Linn. (Dog Nettle, Small Nettle) is found in Dehra Dun and is Udhampur district of J. & K. The inflorescence and leaves contain the flavonoid compounds of kaempferol, isorhamnetin, quercetin, apigenin, diosmetin and luteolin. Presence of chlorogenic acid is also reported.

The fluid extract of roots has been found to be useful in mild cases of prostate enlargement by improving micturia in men over 60 years.

Usnea longissima Ach.

Family ► *Usneaceae.*

Habitat ► Common in temperate and alpine Himalayas, as a moss on trees.

English ► Lichen.

Unani ► Ushnaa.

Action ► Moss—used as an expectorant and in the treatment of ulcers.

Key application ► *German Commission E* approves Usnea (dried thallus of *U. barbata, U. florida, U. hirta* and *U. plicata*) for mild inflammations of the oral and pharyngeal mucosa.

Usnea preparations are used clinically by North American herbalists for antibacterial action against Gram-positive bacteria in local or systemic infections and for antifungal action against *Candida albicans.* (*Expanded Commission E Monographs.*)

U. longissima contains 3–4% usnic acid, also barbatic acid and arabitol. Usnic acid and barbatic acid possess marked anti-tubercular activity. Barbatic acid produces usnic acid, is active against *Streptococcus haemolyticus* and *pneumococcus* sp. and inhibits the growth of *tubercle bacillus.*

Utricularia bifida Linn.

Family ► *Lentibulariaceae.*

Habitat ► Marshy places, as a weed.

English ► Bladder wort.

Folk ► Jhangi (smallar var.)

Action ► Diuretic (used against urinary disorders), anti-inflammatory and antispasmodic (used against cough). Used topically for mucous membrane inflammations, burns and wounds.

U. stellaris is equated with bigger var. of Jhangi.

Uvaria narum Blume.

Family ► *Annonaceae.*

Habitat ► Western ghats from Maharashtra southwards up to an altitude of 1,200 m.

Siddha/Tamil ► Pulichan.

Action ► Root and leaves—used in intermittent fevers, biliousness, jaundice; also in rheumatic affections; bruised in salt water, used in skin diseases. A decoction of the root bark is given to women to control fits at the time of delivery.

Acetogenins, including stereoisomers, are important constituents of the root bark. Glutinone, glutinol, taraxerol, beta-sitosterol and benzyl benzoate have also been isolated. The essential oil of the root bark of Kerala plant contains bornyl acetate 15.2% and patchoulenone 8.1%.

A decoction and roots of *Uvaria gandiflora* Roxb., synonym *U. purpurea* Blume (Indian Botanic Garden, Kolkata) is used for flatulence, stomachache; also after childbirth. A decoction of *U. micrantha* (A. DC.) Hook. f. & Thoms. (tropical forests of the Andamans) is also administered after childbirth as a prophylactic.

V

Vaccaria pyramidata (L.) Medik.

Synonym ► *Saponaria vaccaria* L.

Family ► *Caryophyllaceae.*

Habitat ► Throughout India, as a weed.

English ► Soapwort, Cow Herb.

Folk ► Musna, Saabuni.

Action ► Roots—used for cough, asthma and other respiratory disorders; for jaundice, liver and spleen diseases (increases bile flow). Mucilaginous sap—used in scabies.

Saponins of the root showed haemolytic activity. Lanostenol, stigmasterol, beta-sitosterol and diosgenin have been isolated from the plant. Xanthones, vaccaxanthone and sapxanthone, and a oligosaccharide, vaccarose, have also been isolated.

Vaccinium myrtillus Linn.

Family ► *Vacciniaceae.*

Habitat ► UK, Europe and North America. (About 21 species of Vaccinium are found in India.)

English ► Bilberry, Blueberry.

Action ► Astringent, diuretic, refrigerant.

Key application ► Fruit—in non-specific,acute diarrhoea; topically in mild inflammation of the mucous membranes of the mouth and throat (*German Commission E*); anthocyanine enriched extracts of the fruit, in symptomatic treatment of problems related to varicose veins, such as heavy legs. (*ESCOP.*) Cranberry (*Vaccinium* sp.) is used in urinary incontinence and for UTI prevention. (Sharon M. Herr.)

The main constituents of the Bilberry fruit are anthocyanosides 0.5%. Other constituents include tannins, hydroxycinnamic and hydroxybenzoic acids, flavonol glycosides, flavan-3-ols, iridoids, terpenes, pectins and organic plant acids. (*ESCOP.*)

In India, *V. symplocifolium* Alston, syn. *V. leschenaultii* Wight, known as Kilapalam in Tamil Nadu, is abundantly found in the mountains of South India up to an altitude of 2,400 m *V. neilgherrense* Wight, known as Kalavu in Tamil Nadu and Olenangu in Karnataka, is commonly found in the hills of Kerala, Karnataka and Tamil Nadu at altitudes of 600–2,000 m.

Valeriana dubia Bunge.

Synonym ► *V. officinalis* auct. non Linn.

Family ► *Valerianacea.*

Habitat ► Western Himalayas, Kashmir at Sonamarg at 2,400–2,700 m.

English ► Common Valerian.

Ayurvedic ► Abhramaansi.

Action ► Rhizome and roots—sedative, hypotensive, cardiotonic; depressant on CNS, antispasmodic; used for hysteria, neurosis, nervousness, hypochondriasis.

The roots and rhizomes yielded alkaloids—dipyridylmethylketone, actinidine, iso-valeramide and valerianine; sesquiterpene ketone-valeranone. Bornyl acetate is the major constituent of the root oil, 31.5%, whereas it is only 6.6% in leaf oil. Bornyl isovalerate is reported from the root oil.

Valeriana hardwickii Wall.

Family ► *Valerianaceae.*

Habitat ► The temperate Himalayas from Kashmir to Bhutan at altitudes of 1,200–3,60 m and in the Khasi and Jaintia hills between 1,500 and 1,800 m.

Folk ► Sugandhabaalaa, Tagger, Taggar-ganthodaa. Asaarun (Kumaon).

Action ► Used as *V. jatamansi* and *V. officinalis.*

Valeriana hardwickii is known as Taggar-ganthodaa in Mumbai and Asaarun in Kumaon. In Unani medicine, Asaarun is equated with *Asarum europaeum* Linn. (*Aristolochiaceae*). It is known as Subul-e-barri, Naardinbarri and Persian Tagar; Wild Nard, Hazel Wort and Asarabacca in English. Though sedative and brain tonic, Asaarun should not be equated with Tagara.

Baalaka is a confusing synonym of Tagara. It should be equated with *Pavonia odorata* Willd. (*Malvaceae*).

Baalaka (syns: Ambu, Baala, Barhishtha, Hrivera, Jala, Kacha, Muurdhaja, Udichi, Udichya) is known as Sugandhabaalaa in Northern markets. In South India *Coleus vettiveroides* K. C. Jacob (*Labiateae*) is preferred as Baalaka. *Delphinium brunonianum* Royle (*Ranunculaceae*), with synonyms Kutila, Nata, Vakra, is also used as Tagara.

Valeriana leschenaultii DC. var. **brunoniana** C. B. Clarke.

Family ► *Valerianaceae.*

Habitat ► Karnakata and the Nilgiris.

Ayurvedic ► Tagara (related species).

Folk ► Sugandhabaalaa, Taggar, Baalaka.

Action ► Used as a substitute for valerian.

Valeriana officinalis Linn.

Family ► *Valerianaceae.*

Habitat ► Native to Eurasia. (*V. officinalis* auct. non Linn. is found in Kashmir at Sonamarg at 2,400–2,700 m)

English ► Valerian, Garden Heliotrope, Common Valerian.

Ayurvedic ► Tagara, Nata. Baalaka (syn. Udichya, Jala, Barhishtha) is also equated with *Valeriana* sp.

Folk ► Sugandhabaalaa, taggar.

V

Action ► Tranquillizer, hypnotic, a natural relaxant to higher nerve centres. Used for nervous tension, sleeplessness, restlessness, palpitation, tension, headache, migraine, menstrual pain, intestinal cramps, bronchial spasm.

Key application ► Internally for restlessness and sleeping disorders based on nervous conditions (*German Commission E*). (See *Expanded Commission E, ESCOP* and *WHO* monographs.)

Constituents of the root include valtrates, didrovaltrates and isovalerates. Other constituents include 0.4–1.4% monoterpenes and sesquiterpenes, caffeic, gamma-aminobutyric (GABA) and chlorogenic acids, beta-sitosterol, methyl, 2-pyrrolketone, choline, tannins, gums alkaloids and resin. (*Expanded Commission E Monographs.*)

The volatile oil (0.5–2%) contains bornyl acetate and bornyl isovalerate as the principal components. Other constituents include beta-caryophyllene, valeranone, valerenal, valerenic acid and other sesquiterpenoids and monoterpenes.

The co-occurrence of three cyclopentane-sesquiterpenoids (valerenic acid, acetoxyvalerenic acid and valerenal) is confined to *Valeriana officinalis* L. and permits its distinction from *V. edulis* and *V. Wallichii.* (*WHO.*)

The important active compounds of valerian are the valepotriates (iridoid molecules) and valeric acid. Originally it was thought that valepotriates were responsible for the herbs sedative effect, but, later on, an aqueous extract of the root has also been shown to have a sedative effect. Since valepotriates are not soluble in water, it was concluded that valerenic acid is also the chemical factor responsible for the sedative effect of the herb. Most commercial extracts in Western herbal are water-soluble extracts standardized for valerenic acids.

Large doses of valepotriates from the herb decreased benzodiazepines and diazepam withdrawl symptoms in rats. At low doses valerian enhances binding of flunitrazepam, but at high doses it inhibits binding of the drug. Valerenic acid inhibits breakdown of GABA, and hydroxypinoresinol binds to benzodiazepine receptor. (Sharon M. Herr.)

The safety of valepotriates has been questioned.

Currently valerian is an approved over-the-counter medicine in Germany, Belgium, France, Switzerland and Italy. (*The British Herbal Compendium.*)

See *Valeriana dubia* Bunge, syn. *V. officinalis* auct. non Linn., known as Common Valerian.

Valeriana pyrolaefolia Decne.

Family ► *Valerianaceae.*

Habitat ► The temperate Himalayas from Kashmir to Bhutan.

Ayurvedic ► Dhyaamaka (including among aromatic drugs of Jatamansi group.)

Folk ► Sugandhabaalaa.

Action ► Used as *V. jatamansi.*

Valeriana wallichii DC.

Synonym ► *V. jatamansi* Jones. *Nardostachys jatamansi* (Jones) DC.

Family ► *Valerianaceae.*

Habitat ► Temperate Himalayas from Kashmir to Bhutan, above 3,000 m, and Khasia Hills.

English ► Indian Valerian.

Ayurvedic ► Tagara, Sugandhabaalaa, Kaalaanusaari, Kaalaanusaarikaa, Nata. (*Delphinum brunonianum* Royle, *Ranunculaceae,* syn. Kutila, Nata, Vakra, is also used as Tagara.)

Unani ► Asaarun, Tagar Reshewaalaa.

Siddha ► Tagarai.

Folk ► Taggar, Baalaka, Mushkbaalaa, Asaarun, Tagar-ganthodaa.

Action ► Rhizomes and roots—used as a substitute for *Valeriana officinalis;* prescribed as a remedy for hysteria, nervous unrest and emotional troubles, and as a sedative.

Rhizomes and roots contain cyclopentapyrans, acacetin-7-O-rutinosides, valtrate, didrovaltrate, linarin *iso*-valerinate, valepotriates and an iridoid ester glycoside, valerosidatum. Cyclopentapyrans exhibit sedative, tranquilizing and bacteriocidal properties.

Valtrate and didrovaltrate were cytotoxic to hepatoma cells in culture and inhibited synthesis of DNA and protein in tumor cells.

Root—spasmolytic. Essential oil—antibacterial. (Indian Valerian oils are considered poor as compared to those of *V. officinalis* oils.) The essential oil from roots contains calarene, beta-bargamotene, valeranone, *ar*-curcumene, maalioxide and maalitol. Main acids present are isovaleric acid and (+)-beta-methyl valeric acid.

Valeriana jatamansi auct. non Jones, synonyms *Nardostachys grandiflora* DC. and *N. jatamansi* DC. is equated with Indian Spikenard, Musk-Root and Jataamaansi.

Dosage ► Rhizome—1–3 g powder. (*API,* Vol. I.)

Vallaris solanacea Kuntze

Synonym ► *V. heynei* Spreng. *V. dichotoma* (Roxb.) Wall. ex G. Don.

Family ► *Apocynaceae.*

Habitat ► Throughout India; cultivated in gardens.

Ayurvedic ► Aasphotaa, Asphuka, Bhadravalli, Saarivaa-utpala (white var.).

Folk ► Haapharamaali var. Dudhi-bel (Garhwal).

Action ► Latex—applied to old wounds and sores (mildly irritant). Bark—astringent. Seeds—cardiac tonic.

Seeds are rich in cardiac glycosides; contain acoschimperoside P, mono-O-acetylvallaroside, mono-O-acetylsolanoside, mono-O-acetylacoschimperoside P, vallaroside, vallarosolanoside, solanoside and 16-deacetyl-16-anhydroacoschimperoside P. O-acetylsolanoside is a potent cardiotonic.

The seed oil contains palmitic, oleic and linoleic acids. The leaves gave beta-sitosterol, beta-amyrin and ursolic acid.

Vallaris glabra Kuntze (West Bengal) is also equated with Aasphotaa.

Vallisneria spiralis Linn.

Family ► *Hydrocharitaceae.*

Habitat ► Hydrophyte; throughout India.

English ► Eel-Grass, Tape Grass, Wild Celery.

Ayurvedic ► Shaivala, Shaivaala. (*Ceratophyllum demersum* Linn. is also equated with Shaivala.)

Folk ► Sevaar.

Action ► Plant—stomachic, refrigerant, demulcent. Also used in leucorrhoea and spermatorrhoea.

Extracts of the plant yielded polysaccharides containing D-galactose, D-xylose, L-arabinose, L-rhamnose, uronic acid, acidic xylan and an arabino galactan.

Vanda roxburghii R. Br.

Synonym ► *V. tessellata* G. Don.

Family ► *Orchidaceae.*

Habitat ► From Uttar Pradesh to West Bengal, extending southwards to Kerala.

Ayurvedic ► Raasnaa (used in Eastern India). *Pluchea lanceolata* is the accepted source of Raasnaa. Throughout South India *Alpinia galanga* is used as Raasnaa.

Folk ► Baandaa-Raasnaa.

Action ► Roots—antipyretic, anti-inflammatory, tranquilizer, tonic to liver, laxative. Used in rheumatism, lumbago, inflammations; diseases of the nervous system; diseases of the abdomen, dyspepsia; bronchitis, chest diseases. Roots form a constituent of medicated oils, used externally on rheumatic swellings and neurological affections. Root is also used in the treatment of fractures.

Petroleum ether, chloroform and methanol extracts of the root showed anti-inflammatory activity in rats. Ethanolic extract of the root also showed hepatoprotective activity in albino mice.

The root yielded tetracosyl ferulate and beta-sitosterol D-glucoside. Petroleum ether, chloroform and methanol extracts of the root showed 54.3, 42.1 and 21.9% anti-inflammatory activity at a dose of 0.5 g/kg in rats. Heptacosane, octacosanol and traces of their higher homologues, a bitter principle, saponin, beta-sitosterol and tannins were isolated from the plant.

V

Vanda spathulata Spreng.

Family ► *Orchidaceae.*

Habitat ► Kerala.

Ayurvedic ► Svarna-pushpa Bandaa, Baandaa.

Folk ► Ponnampomaraiva (Kerala).

Action ► Flowers—dried flowers are powdered and given for asthma, consumption, also for mood-swings and psychosomatic bursts.

Vandellia pedunculata Benth.

Synonym ► *Lindernia cordifolia* (Colsmann) Merrill.

Family ► *Scrophulariaceae.*

Habitat ► The Himalayas up to 1,200–1,700 m and throughout India.

Folk ► Gadaga-vel (Maharashtra).

Action ► Used for sexually transmitted diseases and urethral discharges.

Vandellia pyxidaria Maxim, synonym *Vandellia erecta* Benth. (The Himalayas from Kashmir to Assam, common in Bengal; also in central and South India) is known as Vakapushpi. The plant is used for gonorrhoea. Plant juice is given to children who pass green stool.

Vangueria spinosa Hook. f.

V

Synonym ► *Meyna laxiflora* Robyns.

Family ► *Rubiaceae.*

Habitat ► West Bengal, Bihar and Orissa.

Ayurvedic ► Pinditaka, Snigdhpinditaka.

Siddha/Tamil ► Manakkarai.

Folk ► Muyana. Chiracholi, Alu (Maharashtra).

Action ► Fruits—refrigerant and cholagogue; used in biliary complaints and hepatic congestion. Dry fruits—narcotic; used in dysentery.

The seeds contain linoleic, oleic, palmitic and stearic acids.

Vateria indica Linn.

Synonym ► *V. malabarica* Bl.

Family ► *Dipterocarpaceae.*

Habitat ► Peninsular India, from Kanara to Trivandrum and in Coorg.

English ► White Damar, Indian Copal-Tree, Malabar Tallow tree, Piney Varnish-Tree.

Ayurvedic ► Sarja, Sarjaka, Karsya, Sasyasumbara, Devdhuupa, Marich-patraka. Chhaagakarna. Ajakarna and Shaala (related species) are also equated with *V. indica.*

Unani ► Raal.

Siddha/Tamil ► Kungiliyam, Vellai Kundarakam.

Action ► Resin—astringent, antibacterial, antidiarrhoeal, emmenagogue. Used for chronic bronchitis, piles, skin eruptions, ringworm, scrofula, tubercular glands, ulcers, wounds, boils; urinary discharges; amenorrhoea; gonorrhoea and syphilis. Bark—antidysenteric. Oil and resin—antirheumatic. Resin enters into a number of antiseptic and anti-inflammatory ointments. Leaves—juice is applied to cure burns. Orally administered to prevent vomiting.

The Ayurvedic Pharmacopoeia of India recommends the resinous exudate internally (1–2 g) in lipid disorders, anaemia, genitourinary diseases, diarrhoea and diseases due to vitiated blood; externally in gout, abscesses, skin diseases, burns, eruptions.

The bark contains polyphenols—*dl-epi*-catechin, levorotatory isomers of fisetinidol, fzelechin; and bergenin.

Resin is a complex mixture of several triterpene hydrocarbons, ketones, alcohols and acids, along with small amounts of sesquiterpenes. On distillation, the oleoresin gave an essential oil (76%), consisting of phenolic constituents and azulenes. The essential oil shows marked antibacterial activity against Gram-positive and Gram-negative micro-organism.

The leaves and roots contain bergenin and hope phenol. The seed also contain bergenin. Hope phenol showed fungicidal activity. The plant exhibited anti-ulcerogenic activity in rats.

The fruit shell contains 25% tannins.

Dosage ▶ Resinous exudate—1–2 g (*API,* Vol. IV.)

Ventilago denticulata Willd.

Synonym ▶ *V. calyculata* Tul. *V. madraspatana* var. *calyculata* (Tul.) King.

Family ▶ *Rhamnaceae.*

Habitat ▶ Throughout India in hotter parts, usually climbing on trees.

Ayurvedic ▶ Raktavalli.

Siddha/Tamil ▶ Pappili.

Folk ▶ Pitti, Raamadhaani, Kevati (var.).

Action ▶ Stem bark—powdered and mixed with sesame oil, externally applied to skin diseases and sprains. Root bark—used for atonic dyspepsia, mild fever and debility. Sap—used for the treatment of deafness.

The stem bark gave friedelin and several anthraquinones. The root contains anthraquinones, ventinones A and B. Major constituents of the root bark are emodin, its glucoside and corresponding analogues, ventiloquinones. The fruit, leaves and stem gave lupeol, beta-sitosterol and its glucoside.

Ventilago madraspatana Gaertn.

Family ▶ *Rhamnaceae.*

Habitat ▶ Maharashtra and South India.

Ayurvedic ▶ Taamravalli, Kaivartikaa, Vaamataruni.

Siddha/Tamil ▶ Pappili-chaka, Vempadam, Sural-pattai.

Folk ▶ Kevati.

Action ▶ Root bark—carminative, stomachic, febrifuge; used in atonic dyspepsia, debility and skin diseases. The plant is used against scabies.

The roots contain anthraquinones, ventinones A and B, physcion and

chrysophanol. The root bark afforded naphthalene derivatives and several naphthaquinones, anthraquinones—islandicin, emodin, xanthorin and its 5-methyl ether.

In South India, *V. bombaiensis* Dalz. is found in Mukkali forest, Coimbatore District, Tamil Nadu, and *V. goughii* in Coorg, Nilgiris and Kurnool.

Vepris bilocularis (Wight & Arn.) Engl.

Synonym ► *Toddalia bilocularis* Wight & Arn.

Family ► *Rutaceae.*

Habitat ► North Kanara, forests of Malabar, Annamalai and Travancore, up to 1,200 m.

Ayurvedic ► Krishna-Agaru. (In South India *V. bilocularis* is used as Krishna-Agaru and *Dysoxylum labricum* Bedd. ex Hiern as Shveta-Agaru.)

Siddha/Tamil ► Devadaram.

Action ► Wood—extract in oil is used for rheumatic swellings and skin diseases. Root—used for biliousness.

Alkaloids from stem bark included kokusaginine, skimmianine, flindersiamine, evoxanthine, N-methylacridone derivatives, maculine and veprisone. The leaves contain a triterpenoid, lupeol.

Veratrum viride Ait.

Family ► *Liliaceae.*

Habitat ► The temperate regions of northern hemisphere; introduced in Jammu and Kashmir for cultivation.

English ► American Hellbore, Green Hellebore.

Action ► Rhizomes and roots—cardiac depressant, hypotensive. (Contraindicated in cardiac disease. Large doses cause bradycardia.) Used in the treatment of convulsions, headache, neuralgia, inflammatory affections of respiratory tract; and as sedative. Formerly used for high blood pressure, especially associated with toxemia of pregnancy.

Ceveratrum-type alkaloids, found as esters, are hypotensive and cause vasodilatation (probably by inhibition of vasomotor centre and stimulation of the vagus). Overdoses cause vomiting. Alkaloids are teratogenic.

Verbascum thapsus Linn.

Synonym ► *V. phlomoides* L.

Family ► *Scrophulariaceae.*

Habitat ► Temperate Himalayas, Western Ghats and the Nilgiris.

English ► Cow's Lungwort, Common Mullein. (Large-flowered Mullein is equated with *V. densiflorum* Bertol.)

Ayurvedic ► Ban Tambaaku, Gidar Tambaaku, Phullaa.

Action ► Herb—soothing and relaxant for irritable respiratory conditions (asthma, emphysema, tracheitis), pectoral demulcent, antispasmodic, mild sedative.

V

Key application ► In catarrh of the respiratory tract. (*German Commission E.*)

The capsule contains saponins, thapsuines A and B and hydroxythapsuines A and B. The plant also contains varatric acid, 5-ethoxymethyl furfural, saikogenin, alpha-spinasterol and iridoids, aucubin and catalpol. The leaves contain rotenone.

The flower extract showed activity against influenza and herpes simplex virus.

The plant has been employed for the treatment of asthma. There is little evidence to indicate that the plant can offer more than mild astringent and topical soothing effects.

Verbena officinalis Linn.

Family ► *Verbenaceae.*

Habitat ► The Himalayas, Khasi and Lushai Hills, Bihar, West Bengal, Andhra Pradesh and Maharashtra.

English ► Vervain, Pigeon's Grass.

Unani ► Saal-ul-hamaam, Faristari-un.

Action ► Plant—nervine, antidepressant, anticonvulsant; prescribed in liver and gall bladder complaints (spasm of the bladder and strangury), nervous and menstrual disorders; also for bronchitis, asthma and febrile affections.

Included among unapproved herbs by *German Commission E.*

The plant contains an iridoid glycoside, hastatoside; loganin; methylcyclopentane monoterpenoid, verbenalin; verbascoside and eukovoside. The stem and roots are quite rich in stachyose. Aerial parts gave lupeol, beta-sitosterol, ursolic acid, aucubin and artemetin.

The herb is credited with weak parasympathomimetic activity. Verbenalin exhibited mild purgative activity in animal studies. Emetic in high doses.

Vervain tea decreased absorption of non-heme iron by 59% in human subjects. (Sharon M. Herr.)

Vernonia cinerea Less.

Family ► *Compositae; Asteraceae.*

Habitat ► Distributed throughout India. Common in waste places and road side.

English ► Ash coloured Fleabane, Purple Fleabane.

Ayurvedic ► Sahadevi, Uttamkanyaka, Dandotpalaa.

Siddha/Tamil ► Naichotte Poonde.

Action ► Plant—febrifuge, diaphoretic (infusion of herb, combined with quinine, is used against malaria). Used as a specific herb for leucorrhoea, dysuria, spasm of bladder, strangury and for haematological disorders, as a blood purifier and styptic. Also used in asthma. Seeds—anthelmintic, antiflatulent, antispasmodic; used in dysuria, leucoderma, psoriasis and other skin diseases. Roots—anthelmintic; decoction used for colic.

The Ayurvedic Pharmacopoeia of India recommends the plant in inter-

mittent fever, filariasis, pityriasis versicolour (tinea versicolor), blisters, boils, vaginal discharges and in cases of psychoneurosis.

Aerial parts gave luteolin-7-mono-beta-D-glucopyranoside. Whole plant gave triterpene compounds—beta-amyrin acetate, lupeol acetate, beta-amyrin and lupeol; sterols—beta-sitosterol, stigmasterol and alpha-spinasterol; phenolic resin and potassium chloride.

Dosage ► Whole plant—10–20 ml juice; 5–10 g powder for external use. (*API,* Vol. III.)

Vernonia javanica DC.

Synonym ► *V. arborea* Hook. f. non-Buch.-Ham.

Family ► *Compositae; Asteraceae.*

Habitat ► West Bengal, Assam, Meghalaya and Western Ghats.

Siddha/Tamil ► Shutthi.

Action ► Bark—febrifuge. The bark is chewed as a substitute for betel leaves.

Vernonia patula Merrill.

Synonym ► *V. chinensis* Less.

Family ► *Compositae; Asteraceae.*

Habitat ► The Aka hills of Arunachal Pradesh, as a weed.

Action ► Leaves and roots—decoction used in colds and fevers. Young plants—used for the treatment of convulsions in children.

Vernonia roxburghii Less.

Family ► *Compositae; Asteraceae.*

Habitat ► Himachal Pradesh, Uttar Pradesh, West Bengal and Bihar.

Ayurvedic ► Sahadevi (related species).

Folk ► Doraa-baahaa.

Action ► Roots—used for articular rheumatism.

Vernonia teres Wall. ex DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Tropical Himalayas from Kumaon to Sikkim; Bihar and Central India.

Action ► Herb—used for dysmenorrhoea, and for the treatment of wounds and ulcers. Flower-heads—ascaricidal.

The leaf juice showed *in vitro* activity against earthworms, tapeworms and roundworms.

Veronica beccabunga Linn.

Family ► *Scrophulariaceae.*

Habitat ► Western Himalayas and Kashmir at 2,700–3,600 m.

English ► Brooklime.

Folk ► Titalokiyaa, Tezhak.

Action ► Antiscorbutic, blood purifier, alterative, diuretic. Used for scurvy, scrofulous affections, swollen piles, lithiasis, skin diseases, burns, ulcers.

The plant gave iridoid glycosides including aucubin; bitters and tannins. Aucubin has been reported to stimulate the uric acid secretion of the kidneys.

Vetiveria zizaniodes (Linn.) Nash.

Synonym ► *Andropogon muricatus* Retz.
A. squarrosus Hook. f. (non L. f.).

Family ► *Gramineae; Poaceae.*

Habitat ► A perennial grass, cultivated chiefly in Rajasthan, Uttar Pradesh., Punjab and the West Coast.

English ► Vetiver, Khas.

Ayurvedic ► Ushira, Bahu-muulaka, Sugandhimuula, Jataamedaa, Indragupta, Nalada, Laamajjaka, Sevya, Samagandhaka, Jalavaasa, Virana, Aadhya.

Unani ► Cuscus, Khas

Siddha ► Vettiver, Vilamichaver.

Action ► Root—infusion used as refrigerant, febrifuge, diaphoretic; stimulant, stomachic, antispasmodic, emmenagogue, astringent, blood purifier. Used in fevers, colic, flatulence, vomiting, spermatorrhoea and strangury. Root oil—used in obstinate vomiting, colic and flatulence.

The Ayurvedic Pharmacopoeia of India recommend the root in dysuria.

Major constituents of North Indian laevorotatory oil, (obtained from wild roots) are antipodal terpenoids, while those of South Indian dextrorotatory oils (obtained from cultivated roots) are sesquiterpene ketones and alcohols.

The North India Khas oil contains large amounts of khusilal, other sesquiterpenes include khusol, khusimol, khusitone, cadinene and laevojuneol. The South Indian Khas oil constituents are largely nootkatone, vestipiranes and substances of tricyclic zizaane structure. Khusilal is absent in typical dextrorotatory Khas oils.

The oils from other producing countries are found to be dextrorotatory similar to that from South India.

Dosage ► Fibrous root—3–6 g for infusion. (*API*, Vol. III.)

Viburnum coriaceum Blume.

Family ► *Caprifoliaceae.*

Habitat ► The Himalayas from Punjab and Bhutan at altitudes of 1,200–2,500 m, also in the Nilgiris.

Ayurvedic ► Tilvaka (related species).

Folk ► Kaalaa Titmuliyaa, Tita, Karwaa (Kumaon).

Action ► The root and stem bark—antispasmodic, uterine sedative.

Ethanolic extract of the aerial parts shows antiprotozoal activity against *Entamoeba hystolytica.*

The root and stem bark (also of *V. foetidum*) possess distinct odour of the root of valerian. The extracts of root and stem bark exhibited antispasmodic activity and were comparable with those of the bark of *V. opulus* var. *americanum* and *V. prunifolium.*

Laal Titmuliyaa (Kumaon) is equated with *Viburnum mullaha* Buch-Ham.

ex D. Don syn. *V. stellulatum* Wall ex DC.

Viburnum cotinifolium D. Don.

Family ▶ *Caprifoliaceae.*

Habitat ▶ The Himalayas from Kashmir to Bhutan at altitudes of 1,200–3,300 m.

Folk ▶ Richh, Richhabi, Khimor (Punjab), Gwiaa, Ghinwaa, Guyaa, Ghenu (Kumaon).

Action ▶ Bark—used in menorrhagia and metrorrhagia.

Viburnum foetidum Wall.

Family ▶ *Caprifoliaceae.*

Habitat ▶ Khasi hills at altitudes of 900–1,800 m.

Folk ▶ Narwel (Maharashtra).

Action ▶ Leaves—astringent, antispasmodic. Juice used in menorrhagia and as a sedative (a substitute for American Viburnum bark) in uterine disorders, and in post-partum haemorrhage. See *Viburnum coriaceum* and *V. opulus.*

V

Viburnum nervosum Hook. f. & Thoms.

Synonym ▶ *V. grandiflorum* Wall. ex DC.

Family ▶ *Caprifoliaceae.*

Habitat ▶ The Himalayas from Kashmir to Sikkim at altitudes of 3,000–4,000 m.

Ayurvedic ▶ Tilvaka.

Folk ▶ Telam, Timoi (Kumaon), Tilen, Thelkaa (Garhwal).

Action ▶ Bark—astringent; contain 13.1% tannin on dry basis.

Viburnum opulus Linn. var. **americanum** (Mill.) Ait.

Family ▶ *Caprifoliaceae.*

Habitat ▶ Native to North America. Dried bark imported into India.

English ▶ Cranberry Bush, Cramp-bark.

Action ▶ Used as a diuretic and as a uterine sedative in functional uterine disorders.

The activity of the bark has been attributed to the presence of uterine relaxants, acting directly on the muscle and not through sympathomimetic action. The muscle relaxants include an essential oil, an amorphous, bitter phenolic glucoside, esculetin and scopoletin.

The bark contains hydroquinones, arbutin, methylarbutin and traces of hydroquinone; coumarins including scopoletin and scopoline; tannins mainly catechins.

The polycondensed tannins produced significant angioprotective effect in rats.

Viburnum prunifolium Linn.

Family ▶ *Caprifoliaceae.*

Habitat ► Native to eastern and central USA. (Experimental cultivation in the Nilgiri hills.)

English ► Black Haw.

Ayurvedic ► Tilvaka (related species).

Action ► Uterine sedative (used in the treatment for threatened miscarriage, under strict medical supervision. Spasmolytic. (*The British Herbal Pharmacopoeia.*) Used after childbirth to check bleeding and pain, also in dysmenorrhoea.

The stem and root bark gave coumarins including scopoletin, aesculetin and scoplin; a biflavone, amentoflavone; triterpenes including oleanolic and ursolic acid and their acetates, caffeic acid derivatives; salicylic acid, salicin, arbutin (traces); tannins (2%).

Coumarin, scopoletin, is a uterine sedative, while salicin is an analgesic.

Vicia faba Linn.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Native to North Africa; commonly grown in North Western India.

English ► Broad bean, Windsor bean.

Unani ► Baaqlaa.

Action ► Fresh beans—cooked alone or with meat, are prescribed in Unani medicine for cough, also for resolving inflammations. Externally, the bean and flowers are used as a poultice for inflammations, warts and burns.

A number of harmful principles are reported in the broad beans. A large amount of Dopa, mainly in free state and partly in the form of its beta-glucoside; and gluco alkaloids, vicine and convicine, have been isolated.

Ingestion of fresh, uncooked or partially cooked beans is not recommended.

The seeds gave positive test for hydrocyanic acid and also contain arsenic.

The fresh beans exhibit an oestrogenic activity. Phytoalexins of the immature seeds exhibit antifungal activity.

Malic, citric and glyceric acids are the principal organic acids present in the pods (also present in the hulls). The glyceric acid on subcutaneous injection produced a marked diuresis in rabbit. (A decoction of the leaves and stems of the field bean, *Faba vulgaris* Moench, is used as a diuretic.)

An aqueous extract of the root nodules exhibited vasoconstricting activity on rabbits.

Vicoa indica DC.

Synonym ► *V. auriculata* Cass.

Family ► *Compositae; Asteraceae.*

Habitat ► Throughout the drier parts of India, ascending to an altitude of about 1,800 m in the Himalayas.

Ayurvedic ► Vandhyaavari.

Siddha/Tamil ► Jimikipoo, Mookuti, Poondu.

Folk ► Banjhori, Vajarangi.

Action ► Plant—used for contraception.

Aerial parts contain the sesquiterpene lactones (vicolide A-D), the 28-nortriterpenoidal glucosides (vicoside A and B), the triterpenoid vicosigenin and monoterpenediol vicodiol, besides several *n*-alkanes and *n*-alkanoic acid esters.

Vicolide A-D showed anti-inflammatory activity against cotton pellet granuloma in rats. Vicolide D showed antipyretic activity.

Antifertility activity has been attributed to the presence of vicolide B and D, while A and C have been reported to be devoid of antifertility activity. Vicolide D was found to be anti-oestrogenic in nature.

Victoria regia Lindl.

Synonym ► *V. amazonica* Sow.

Family ► *Nymphaeaceae.*

Habitat ► Native to South America; grown in pools in botanic gardens.

English ► Royal Waterlily. Water Maize (seeds).

Ayurvedic ► Brihat-patra Kamal.

Action ► Seed—refrigerant, cooling to the nervous system. Pond Lily root—externally, astringent, antiscrofulous. An infusion is used as a gargle for ulcers in the mouth and throat.

The leaves contain the anthocyanins, delphinidin and cyanidin.

Vinca major (Linn.) Pich.

Synonym ► *V. pubescens* Urv.

Family ► *Apocynaceae.*

Habitat ► Native to Europe. Found in the Himalayas, West Bengal and Palni Hills.

English ► Green Periwinkle, Greater Periwinkle.

Action ► Astringent, antihaemorrhagic, hypotensive. Used to treat menorrhagia and leucorrhoea.

The herb contains indole alkaloids; majdine, isomajdine, majoridine, akuammine, akuammigine, carpanaubine, irvine, reserpine, serpentine, sarpagine, tetrahydroalstonine, vincamajine and vincamajoreine; and tannins.

The cytotoxic dimeric alkaloids present in Vinca rosea L., used in the treatment of certain types of cancer, have not been found in Vinca major.

Vinca minor Linn.

Family ► *Apocynaceae.*

Habitat ► Grown in Indian gardens as an ornamental.

English ► Lesser Periwinkle.

Action ► Astringent and circulatory stimulant (contain alkaloid vincamine). Used for gastric catarrh, chronic dyspepsia; restlessness, headache, dizziness, and for the prevention of premature aging of brain cells, as a geriatic support.

The herb contains indole alkaloids (0.15–1.4%). The major constituent

in vincamine; others include vinic, apovincamine, vincadifformin.

Vincamine is hypotensive; increases blood flow and oxygen supply to the brain. The vincamine content in the herb is low and fluctuates greatly. Overdose of the extract brings about a severe drop in blood pressure.

Vincamine, as a pure substance is available for therapeutic administration.

Vinca pusilla Murr.

Synonym ► *Catharanthus pusillus* G. Don.
Lochnera pusilla (Murr.) K. Schum.

Family ► *Apocynaceae.*

Habitat ► West Bengal and throughout greater part of India, as a weed.

Ayurvedic ► Sangkhi, Sangkhaphuli (The Wealth of India).

Folk ► Milagaipoondu (Tamil Nadu), Kapavila (Kerala), Vishakanegale (Karnataka), Neru (Andhra Pradesh) Mirchaai (Bihar).

Action ► Plant—oncolytic (tumour-resolving). A decoction of the dried plant boiled in oil is used in the treatment of lumbago.

The plant contains ajmalicine, rauwolscine, vindoline, pusiline and pusilinine, while leurosine, lochnerinine, venoterpine, vindorosine and vincapusine have been isolated from the leaves.

The root gave lochnericine.

Leurosine is cytotoxic. Pusiline and pusilinine cause marked depression of the heart.

Vinca rosea Linn.

Synonym ► *Catharanthus roseus* (Linn.) G.Don.

Family ► *Apocynaceae.*

Habitat ► Native of West Indies; commonly grown in Indian gardens.

English ► Madagascar Periwinkle.

Ayurvedic ► Sadaapushpaa, Sadampushpa, Nityakalyaani, Sadaabahaar.

Siddha ► Nithiya kalyani, Sudukadu mallikai.

Action ► Cytotoxic.

Over one hundred monomeric and bisindole alkaloids have been isolated.

The indole alkaloid, vincamine, is a vasodilator; the bisindole alkaloids vinblastine and vincristine proved to be highly effective as cancer chemotherapeutic agents.

Vinblastine and vincristine are clinically used in a number of thrombocytopenic disorders, such as refractory idiopathic thrombocytopenic purpurea and haemolytic anaemia.

Vinblastine in combination with other chemotherapeutic agents (cisplatin and bleomycin) is used for the treatment of metastatic testicular cancer; also against bladder cancer, breast cancer, non-small cell lung cancer and Hodgkin's lymphoma in combination with other drugs.

Vincristine, in various combinations, is highly effective in acute leukemia in children and lymphocytic leukemia; and pediatric tumours. (*The Treatise on Indian Medicinal Plants.*)

Viola biflora Linn.

Family ► *Violaceae.*

Habitat ► The temperate Himalayas from Kashmir to Sikkim at altitudes of 1,800–3,000 m.

Unani ► Banafashaa (related species).

Action ► Leaves—laxative, emollient. Flowers—antiseptic, pectoral, diaphoretic. Root—emetic.

The herb is used as a substitute for Banafashaa obtained from *V. odorata.*

The leaves are used for treating skin eruptions and the flowers for skin irritation.

Viola cinerea Boiss. var. **stocksii** (Boiss.) W. Beck.

Synonym ► *V. stocksii* Boiss.

Family ► *Violaceae.*

Habitat ► Punjab, Western Rajasthan, Gujarat.

Unani ► Banafashaa (related species).

Folk ► Jinkobanafashaa (Gujarat).

Action ► Root—emetic. Used as a substitute and adulterant of ipecac. The herb is sold in the market as Banafashaa.

V

Viola odorata Linn.

Family ► *Violaceae.*

Habitat ► Native to Europe; cultivated in Kashmir.

English ► Sweet Violet.

Unani ► Banafashaa, Banafsaj, Kakosh, Fareer.

Action ► Expectorant, anti-inflammatory, diaphoretic, antipyretic, diuretic. Used for catarrhal and pulmonary affections, also for diseases of liver and intestines.

Included among unapproved herbs by *German Commission E,* but it has been mentioned that the traditional use of sweet violet root as an expectorant for the respiratory tract is well documented.

The British Herbal Pharmacopoeia recognizes expectorant activity of the leaf.

The flowers (var. *maxima*) are a source of rutoside. The flowers also contain anthocyanin, violanin chloride, which on hydrolysis yields glucose, delphinidin, rhamnose and *p*-coumaric acid. High content of tocopherol is also reported from flowers.

Dried flowers contain anthocyanin 4.0, total flavonoids 1.1, rutoside 0.4, mucilage 18, and ash 8.5%.

The leaves contain friedelin and beta-sitosterol.

The essential oil from the entire plant consists of methyl salicylate. A *di*-C-glycoside, violanthin, has been reported from the plant.

Viola patrinii Ging.

Family ► *Violaceae.*

Habitat ► The Himalayas, Eastern and Western Ghats.

Unani ► Banafashaa (related species).

Action ► Dried flowers—used for coughs and colds. Herb—

bruised and applied to ulcers; also prescribed in syphilis and scrofula. (In Chinese medicine, recommended against cancerous growths.)

Viola pilosa Blume.

Family ► *Violaceae.*

Habitat ► Kashmir to Sikkim and Nilgiri hills at 1,500–2,100 m.

Unani ► Banafashaa (related species)

Folk ► Thungtu (Kumaon).

Action ► Uses same as those of *V. odorata.* A medicinal oil of Unani medicine, Roghan-e-Banafashaa, is prepared from the plant. Flowers, as tea, are used for treating headache.

Active principle of the herb is an alkaloid, violine.

Viola sylvestris Lam. (in part)

Family ► *Violaceae.*

Habitat ► Kashmir at 1,200–2,400 m.

English ► Pale Wood Violet, Wood Violet.

Unani ► Banafashaa (related species).

Action ► Plant—pectoral, bechic; used in chest troubles. Stem, leaf and flower—applied to foul sores and wounds.

Viola tricolor Linn.

Family ► *Violaceae.*

Habitat ► Native to Europe; grown as an ornamental.

English ► Heartsease, Wild Pansy.

Unani ► Banafashaa (related species).

Action ► Herb—anti-inflammatory, antiallergic, expectorant, diuretic, antirheumatic, alterative. Used for bronchitis, rheumatism, chronic skin disorders and for preventing capillary haemorrhage when under corticosteroid therapy. Root—antidysenteric; used as a substitute for *Cephaelis ipecacuanha.*

Key application ► Externally in mild seborrheic skin diseases and milk scall in children. (*German Commission E.*) *The British Herbal Pharmacopoeia* recognizes the herb as an expectorant and dermatological agent.

The herb contains rutin, violin and salicylic acid. The flower contains rutin, quercetin, violanthin (6,8-diglycoside of apigenin), violaxanthin, *p*-hydroxycinnamic acid and delphinidin. A flavone C-glycoside-saponarin has also been obtained from flowers. Flowers, in addition, contain 15-*cis*-violaxanthin.

The herb exhibits anticoagulant property and diminishes the aggregation of platelets. It can be used as a preventive measure against thrombosis.

Viscum album Linn.

Synonym ► *V. costatum* Gamble.

Family ► *Viscaceae; Loranthaceae.*

Habitat ► Temperate Himalayas from Kashmir to Nepal between 1,200 and 2,700 m (a semiparasitic plant).

English ► European Mistletoe.

Ayurvedic ► Bandaaka, Suvarnabandaaka. Vrikshaadani (substitute).

Unani ► Kishmish Kaabuli.

Action ► Vasodilator, cardiac depressant, tranquiliser, stimulates the vagus nerve which slows the pulse, anti-inflammatory, diuretic, immune enhancer, antineoplastic. Used for hypertension and tachycardia, as a nervine tonic.

The extract of leafy twigs is anti-inflammatory exerting an action upon capillary permeability and oedema. It stimulates granulation and the neoformation of connective tissue.

Key application ► For treating degenerative inflammation of the joints by stimulating cuti-visceral reflexes following local inflammation brought about by intradermal injections; as palliative therapy for malignant tumour through non-specific stimulation. (*German Commission E.*)

V

Mistletoe contains glycoproteins; flavonoids, usually quercetin-derived (dependent on host tree to some extent); polypeptides; phenylcarboxylic acids; polysaccharides (including viscid acid); alkaloids; lignans.

Cardiotonic activity is due to the lignans. The polysaccharides stimulate the immune response. Antineoplastic activity is claimed to be responsible for prolongation of survival time in cancer patients. Polypeptides (viscotoxins) inhibit tumours and stimulate immune resistance.

(For uses of lectin from Mistletoe in cancer, see *Eur J cancer,* 2001, Jan, 37(1), 23–31; *Eur J Cancer* 2001, 37 (15), 1910–1920.) (For application in hepatitis, see *Fitoterapia,* 70, 2001.)

Viscum articulatum Burm.

Family ► *Viscaceae, Loranthaceae.*

Habitat ► Most parts of India; a superparasite in Western India on *Loranthus* sp. which itself is parasitic on *Eugenia* sp.

Ayurvedic ► Bandaak (related species); Jivantikaa, Kaamavriksha, Nilavalli. (*The Wealth of India.*)

Folk ► Panapuuduu (Maharashtra), Bodobaando (Gujarat).

Action ► Plant—febrifuge, aphrodisiac. Paste is applied to bone fractures.

The plant gave oleanolic acid, ceryl oleanolate and *meso*-inositol.

Viscum monoicum Roxb. ex DC.

Family ► *Viscaceae; Laoranthaceae.*

Habitat ► Sikkim, a parasite of Strychnos nux-vomica tree.

Ayurvedic ► Katukavalli, Pashumohanikaa.

Siddha/Tamil ► Pulluri, Pullurivi.

Folk ► Kuchleikaa-malang, Kuchlekaa-baandaa.

Action ► Properties more or less similar to *Strychnos nux-vomica*. Used as a substitute for strychnine and brucine.

(The plant is also parasitic on *Albizia amara, A. odoratissima, Pongamia pinnata* and *Ziziplus oenoplia*.)

Viscum orientale Willd.

Family ► *Viscaceae; Loranthaceae.*

Habitat ► Bihar, West Bengal and Kerala. (The plant parasitizing *Strychnos nux-vomica* tree are used in Indian medicine.)

Folk ► Baandaa.

Action ► Used as a substitute for nux-vomica. Poultice of leaves is used for neuralgia; ashes of the plant for the treatment of skin diseases.

Vitex agnus-castus Linn.

Family ► *Verbenaceae.*

Habitat ► Mediterranean region; South-West Asian countries, up to Pakistan. (Seeds are imported from Iran.)

English ► Monk's Pepper-tree, Hemp tree.

Ayurvedic ► Renukaa (seed). Renukaa and Harenukaa are synonyms in Indian medicine.

Unani ► Sambhaalu.

Action ► Dried ripe fruit—acts on the anterior pituitary gland, reducing FSH and increasing LSH; stimulates production of progesterone by reducing oestrogen; used as a substitution therapy in primary and secondary corpus luteum deficiency. Used for premenstrual syndrome, for regulating hormones in amenorrhoea and for bleeding between periods; also as a galactagogue and to assist bust development.

The herb is also used in the treatment of premature old age due to sexual excess, nervous debility and impotence (as a homoeopathic drug). *Vitex agnus* extract is found to lower prolactin levels in men (the decrease in prolactin levels results in improved sexual performance. Males with hyperprolactinaemia frequently face impotence).

Key application ► In irregularities of menstrual cycle, premenstrual complaints, mastodynia. (*German Commission E.*) As a hormonal modulator. (*The British Herbal Pharmacopoeia.*)

The methanolic extract of the flowering stems of *Vitex agnus-castus* yielded iridoids, angnucastoside-A, B and C, in addition to aucubin, agnuside, mussaenosidic acid and 6′-O-*p*-hydroxybenzoylmussaenosidic acid, and phenylbutenone glucoside, myzodendrone.

Dopaminergic compounds, present in the herb, are clinically important compounds which improve premenstrual mastodynia and other symptoms of premenstrual syndrome.

The herb may counteract birth control pills. (Sharon M. Herr.)

Vitex leucoxylon Linn. f.

Family ► *Verbenaceae.*

Habitat ► Throughout Deccan Peninsula.

Ayurvedic ► Paaraavata-padi, Kaakajanghaa. (Kaakajanghaa is also equated with *Leea aequata* Linn.)

Action ► Roots—febrifuge, astringent.

Ethanolic extract and cold aqueous infusion of the leaf were found to suppress acetic acid-induced writhing in mice and carrageenan-induced hind paw oedema in rats. The flavonoids exhibited anti-inflammatory activity.

Vitex negundo Linn.

Family ► *Verbenaceae.*

Habitat ► Throughout India in the warmer zones; ascending to 900 m in the North-western Himalaya.

English ► Five-leaved Chaste tree.

Ayurvedic ► Nirgundi, Shephaalikaa, Sindhuka, Sindhuvaara, Suvahaa, Sugandhikaa. Nila, Nilanirgundi, Shveta nirgundi (var.). White-flowered var. is known as Sinduvaara, blue-flowered as Nirgundi or Shephaali,

Unani ► Sambhaalu, Fanjankisht.

Siddha/Tamil ► Nochi, Nalla Nochi, Vellai Nochchi, Nirkundi.

Action ► Seeds—prescribed in spermatorrhoea, and for promoting spermiogenesis (in Unani medicine). Also given as a rejuvenating tonic for retarding old age and for retaining and promoting virility. (in Ayurvedic medicine). Leaf—anti-inflammatory, analgesic; removes foetid discharges and worms from ulcers. Flowers—astringent, febrifuge, antidiarrhoeic; prescribed in liver complaint. Oil—applied to sinus, scrofulous sores.

The Ayurvedic Pharmacopoeia of India recommends the leaf (also the root) in excessive vaginal discharges, oedema, skin diseases, pruritus, helminthiasis, rheumatism, and puerperal fever.

A water extract of the leaves, when administered to rats, exhibited anti-inflammatory, analgesic, antihistaminic and membrane stabilizing and antioxidant activities. (*J. Ethnopharmocol,* 2003, (203), 199–206.) Methanolic extract of leaves showed remarkable antihistaminic activity.

The leaves contain iridoid glycosides, isomeric flavanones and flavonoids, besides casticin and the glucosides, luteolin-7-glucoside and alpha-D-glucoside of a tetrahydroxy monomethoxy flavone.

Dried powder of roots contains hentriacontane, beta-sitosterol and its aetat and stigmasterol. Alcoholic extract of the root showed 40–60% anti-implantation activity with no anti-ovulatory effect in rats.

Flavone vitexicarpin (1), isolated from the leaves, exhibited broad cytotoxicity in human cancer cell line panel. Two pentacyclic triterpenoids, betulinic acid and ursolic acid, along with an aliphatic alcohol, *n*-hentriacontanol,

beta-sitosterol and *p*-hydroxybenzoic acid have been isolated from leaves.

The seeds contain *p*-hydroxybenzoic acid, 5-oxyisophthalic acid, glucose and the triterpene, vitextriterpene. Several anti-inflammatory triterpenoids and flavonoids have also been isolated from the seeds. The flavanone, 5,7,3′ trihydroxy-6, 8,4′-trimethoxyflavone exhibited anti-androgenic activity in adult mice and dogs.

Dosage ► Leaf—10–15 ml juice (*API*, Vol. III); root—10–12 ml juice (*API*, Vol. IV.)

Vitex peduncularis Wall. ex Schauer.

Family ► *Verbenaceae.*

Habitat ► Assam, West Bengal, Bihar and South India.

Ayurvedic ► Kaakajanghaa. (*Leea aequata* Linn. is also equated with Kaakajanghaa.)

Folk ► Chirai-godaa, Chirai-gorwaa, Naagpheni.

Action ► Leaves and bark—used in malarial and black water fevers. Leaves—antibacterial.

The leaves and root bark gave pachypodol, ursolic acid, vitexin and peduncularcin.

Vitex trifolia Linn.

Family ► *Verbenaceae.*

Habitat ► Throughout India in tropical and subtropical regions.

Ayurvedic ► Sinduvaara, Nirgundi (white var.).

Siddha/Tamil ► Karu Nochi, Siru Nochi.

Folk ► Paani-Sambhaalu.

Action ► Leaves—febrifuge, antibacterial, anthelmintic, cytotoxic. Extract of the leaves showed inhibitory action against *Mycobacterium tuberculosis.* Leaves used as poultice in rheumatism, inflammations and sprains. Root and flowers—febrifuge. Root—expectorant. Fruit—used in amenorrhoea.

Aerial parts gave friedelin, beta-sitosterol and its beta-D-glucoside, and a long chain hydrocarbon. The leaves gave the flavonoids—artemetin, luteolin, orientin, casticin; and iridoid glycosides, aucubin and agnuside. The fruits contain an alkaloid, vitricin.

Vitrosin A and vitexicarpin, isolated from the plant, blocked spontaneous contraction of isolated guinea-pig trachea induced by histamine. (*Planta Med,* 2002, Nov., 68/11).

The leaves are reported to improve memory and favour hair growth. Leaf extract showed significant antitumour activity in the murine tumour system.

Vitis vinifera Linn.

Family ► *Vitaceae.*

Habitat ► A woody, shrubby vine, cultivated in Punjab, Rajasthan, Delhi, Uttar Pradesh Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu for edible fruits.

English ► Wine Grape, European Grape. (Chinese: P'u-t'ao.)

Ayurvedic ► Draakshaa, Go-stani, Mrdvikaa. Dehydrated fruit—Daakh, Munnakaa, Kishmish.

Unani ► Angoor. Dehydrated fruit—Daakh, Maweez, Zabeeb, Munaqqaa, Kishmish.

Siddha ► Draksha.

Action ► Dried fruits, seedless—nourishing and invigorating. Used in prescriptions for cough, respiratory tract catarrh, subacute cases of enlarged liver and spleen; and in alcohol-based tonics (Aasavs).

The Ayurvedic Pharmacopoeia of India recommends dried mature fruits (5–10 g) in anaemia, jaundice, dyspepsia, constipation, haemorrhagic diseases, gout, cough, dyspnoea, and alcoholism.

Grape vine contains flavonoids, tannins, tartrates, inositol, carotenes, choline and sugars. The fruit contains tartaric and malic acids, sugars, pectin, tannin, flavone glycosides, vitamins A, B1, B2, C and minerals; anthocyanins in red leaves and red grapes. Anthocyanins reduce capillary permeability. Red leaves are astringent and anti-inflammatory; an infusion is used for diarrhoea, heavy menstrual bleeding and uterine haemorrhage; also in the treatment of varicose veins and haemorrhoids.

Oligomeric proanthocyanidin extract of the seed is used in atherosclerosis due to its free radical scavenging ability, also in venous insufficiency, night vision, oedema due to injury and post surgery oedema.

Proanthocyanidin extract decreased hepatotoxicity of acetaminophen in mice. Grape polyphenols, extracted from skin and seeds decreased hepatic injury from alcohol, but had no effect on ethanol-induced lipid changes in rats. (Sharon M. Herr.)

Dosage ► Dried mature fruits—5–10 g. (*API,* Vol. III.)

Vocanga foetida (Blume) Rolfe.

Synonym ► *Orchipeda foetida* Blume.

Family ► *Apocynaceae.*

Habitat ► Indonesia; cultivated in Indian gardens.

Action ► Latex—used for treating fistula, pustules and tumours.

The bark contains a bitter alkaloid (yield 0.25%).

A related species, *V. grandifolia* (Miq.) Rolfe has been introduced into the Indian Botanic Garden, Kolkata. All parts of the plant contain alkaloids which vary seasonally. The trunk bark contains as high as 2.72% of alkaloids on dry basis in November. The leaves contain a mixture of alkaloids (yield up to 1.23% on dry weight basis) containing vobtusine, vobtusine lactone and deoxyvobtusine.

Volutarella ramosa Roxb.

Synonym ► *V. divaricata* Benth & Hook. f., in part.

Tricholepis procumbens Wight.
Amberboa divaricata Kuntge.

Family ► *Compositae.*

Habitat ► All over India, except West Bengal and eastwards.

Unani ► Baadaavard, Al-baavard, Shukaayi.

Folk ► Bhu-dandi, Sukaayi (Maharashtra).

Action ► Plant—deobstruent, aperient, febrifugal, styptic. Used for disorders of the liver. The mucilage is used in coughs.

The plant yielded a glucoside procumbenin A which yields an aglycone procumbenidine and glucose on hydrolysis. Fructose, surcose, lactose and maltose are also present in the plant.

Shukaayi of Unani medicine is also known as Al-shukaayaa, Al-shaukat-ul-arabia and Arabian Thorn. The fruit and root are used in Unani medicine in chronic fevers and diseases of liver and intestines.

Baadaavard has also been equated with *Tricholepis procumbens* Wight and *Carduus bendictus. Tricholepis* sp. are known as Brahmadandi in Ayurvedic medicine. *Carduus nutans* Linn. is known as Gul-Baadaavard in Kashmir and is used as febrifuge.

W

Wagatea spicata Dalz.

Family ► *Caesalpiniaceae.*

Habitat ► Western Ghats.

Ayurvedic ► Guchh-karanja.

Siddha ► Okkadi-kodi, Pulinakk-agondai.

Folk ► Vaakeri (Maharashtra). *Caesalpinia digyna* Rottl. is also known as Vaakeri.

Action ► Roots—used in pneumonia. Bark—used externally in skin diseases.

The root contains vakerin. Vakerin did not inhibit the stimulating effect of histamine and acetylcholine.

Pods contain considerable quantity of tannic acid.

Wahlenbergia marginata (Thunb.) A. DC.

Synonym ► *W. gracilis* Schrad.

Family ► *Campanulaceae.*

Habitat ► Native to South Africa; occurring throughout India.

Folk ► Tosad kesari, Dudma Saaga.

Action ► Root—used in pulmonary infections. Herb—used externally for strengthening the loose teeth, also for skin diseases.

The flower contains delphinidin-chloride-3, 5-diglucoside. The roots contain glucose, sucrose, methyl 9, 12-octadecadienoate, beta-sitosterol, beta-sitosterol glucoside and lupenone.

Walsura trifoliata (A. Juss.) Harms.

Synonym ► *W. piscidia* Roxb.

Family ► *Meliaceae.*

Habitat ► Karnataka, Western Ghats, Palni and Anaimalai Hills, also western India.

Siddha/Tamil ► Cheddavokko, Kanjiram.

Folk ► Waalsuuraa.

Action ► Bark—stimulant, expectorant, emmenagogue, emetic. Also used to kill vermin in the hair.

The bark contains saponin and tannin.

Waltheria indica Linn.

Synonym ► *W. americana* Linn.

Family ► *Sterculiaceae.*

Habitat ► Tropical regions of India.

Siddha/Tamil ► Shembudu.

Folk ► Khar-Duudhi (Bengal).

Action ► Plant—emollient, bechic, febrifuge, purgative, abortifacient. Root—prescribed in internal haemorrhages.

The plant yields pelargonidin and cyanidin glycoside and apigeninidin. Anthocyanins were also detected. The alkaloid, adouetin-7 sulfamate, induced hypothermia and sedation at low levels and hyperexcitability at high levels.

A decoction of roots possesses antisyphlitic property.

Wedelia biflora DC.

Family ► *Compositae; Asteraceae.*

Habitat ► Near sea-coasts and the Andamans.

Ayurvedic ► Bhringaraaja (yellow-flowered var).

Action ► Leaves—used as poultice on ulcers, sores, varicose veins; paste applied to fungal infections. Leaf decction—vulnerary and antiscabious. The juice of leaf is also given internally with cow's milk as a tonic after child birth.

The dried leaves contain veratrylidene hydrazide and quercetin derivatives. The stem contains stigmasterol and grandifloric acid. The leaves and stem showed antifungal activity.

W

Wedelia calendulaceae Less. non-Rich.

Synonym ► *W. chinensis* Merrill.

Family ► *Compositae; Asteraceae.*

Habitat ► Bengal, Assam, Konkan, and Tamil Nadu.

Ayurvedic ► Bhringaraaja (yellow-flowered var.), Pitabhringi, Pitabhringa-raaja, Avanti, Kesharaaja, Kesharaaga.

Siddha/Tamil ► Manjal karisaalai, Potralai kaiyan tagarai, Patalai Kaiantakerai.

Action ► Leaves—bechic; used in alopecia, juice used for dyeing hair and for promoting hair growth. Plant—deobstruent; used in menorrhagia and abdominal swellings, as a tonic for hepatic and splenic enlargement.
See *Eclipta alba.*

The expressed juice of the herb contained an oil-soluble black dye 11.2; tannin 220; saponin 500 (contradictory reports) and phytosterol 3.75 mg/100 g among other constituents. The leaves contain isoflavonoids.

The bisdesmosidic oleanolic acid saponins have been isolated from the fresh leaves. Significant hepatoprotective activity has been found in the prosaponin from ginsenoside Ro (chikusetsusaponinV); and in coumestans, wedelolactone and demethyl wedelolactone, isolated from the methanol extract of the herb.

Wedelolactone has also been found to be a potent and selective 5-lipoxygenase-inhibitor, the process being an oxygen radical scavenger mechanism.

Wedelolactone (0.05%), isolated from the leaves, is analogous in structure to coumestrol, an estrogen from *Melilotus* sp. (clover).

Wendlandia exserta DC.

Family ► *Rubiaceae.*

Habitat ► Sub-Himalayan region, West Bengal, Madhya Pradesh, Andhra Pradesh and Maharashtra.

Ayurvedic ► Tilaka.

Folk ► Tiliyaa (Bihar), Tilki, Mimri (Bengal).

Action ► Bark—administered in urinary affections.

Wendlandia tinctoria DC.

Family ► *Rubiaceae.*

Habitat ► Sub-Himalayan tract from Garhwal eastwards to Bhutan and Khasi hills.

Ayurvedic ► Tilak (related species).

Action ► Bark—used for cramps in cholera patients.

Wigandia caracasana Kunth.

Family ► *Hydrophyllaceae.*

Habitat ► Native to tropical America; introduced into Indian gardens.

Action ► Leaves and branch tips—a decoction is used in rheumatism; also for whooping cough and respiratory problems.

Solvent extracts of the leaves (ethanol, acetone and *n*-hexane) were found active against Gram-positive bacteria.

Wikstroemia indica Mey.

Synonym ► *W. viridiflora* Meissn. *W. indica* var. *virdiflora* Hook. f.

Family ► *Thymelaeaceae.*

Habitat ► Eastern Assam; as a weed in Tamil Nadu.

English ► Small-Leaf Salago.

Folk ► Salago.

Action ► Root bark—diuretic, vesicant, purgative and piscicidal.

The root bark is reported to contain a flavone glycoside, wikstroemin, which exhibited diuretic activity.

In Chinese folk medicine, the bark is used for schistosomiasis.

The stem contains wikstromol, a lignin prototype which exhibited antineoplastic activity. Daphnoretin, isolated from the plant, caused platelet aggregation in the blood of rabbits. A polysaccharide, comprising glucose, arabinose, galacturonic acid, galactose and xylose, protected mice against radiation and enhanced the formation of macrophages.

Withania ashwagandha Kaul (cultivated var.)

W. somnifera (Linn.) Dunal (Chemotype I, II, III: Israele.)

Family ► *Solanaceae.*

Habitat ► Throughout the drier and subtropical parts of India.

English ► Winter Cherry. (*Physalis alkekengi* is also known as Winter Cherry.)

Ayurvedic ► Ashwagandhaa, Hayagandhaa, Ashwakanda, Gandharvagandhaa, Turaga, Turagagandhaa, Turangagandhaa, Vaajigandhaa, Gokarnaa, Vrishaa, Varaahakarni, Varadaa, Balyaa, Vaajikari. (A substitute for Kaakoli and Kshirakaakoli.) Cultivated var.: Asgandh Naagori. (Indian botanists consider the cultivated plants distinct from the wild ones.)

Unani ► Asgandh.

Siddha ► Amukkuramkizhangu.

Action ► Root—used as an anti-inflammatory drug for swellings, tumours, scrofula and rheumatism; and as a sedative and hypnotic in anxiety neurosis. Leaf—anti-inflammatory, hepatoprotective, antibacterial. Fruits and seeds—diuretic. Withanine—sedative, hypnotic. Withaferin A—major component of biologically active steroids; as effective as hydrocortisone dose for dose. Antibacterial, antitumour, antiarthritic, significantly protective against hepatotoxicity in rats.

The root contains several alkaloids, including withanine, withananine, withananinine, pseudo-withanine, somnine, somniferine, somniferinine. The leaves of Indian chemotype contain 12 withanolides, including withaferin A. Steroidal lactones of withanolide series have been isolated.

Withanine is sedative and hypnotic. Withaferin A is antitumour, antiarthritic and antibacterial. Anti-inflammatory activity has been attributed to biologically active steroids, of which withaferin A is a major component. The activity is comparable to that of hydrocortisone sodium succinate.

Withaferin A also showed significantly protective effect against CCl4-induced hepatotoxicity in rats. It was as effective as hydrocortisone dose for dose.

The root extract contains an ingredient which has GABA mimetic activity.

The free amino acids present in the root include aspartic acid, glycine, tyrosine, alanine, proline, tryptophan, glutamic acid and cystine.

The Ayurvedic Pharmacopoeia of India recommends Ashwagandha in impotency. This claim could not be sustained in a recent experiment and raises a doubt about the equation of classical Ashwagandha with Withania somnifera. A methanolic extract of Withania somnifera root induced a marked impairment in libido, sexual performance, sexual vigour and penile dysfunction in male rats. (Llayperuma et al, *Asian J Androl,* 2002, 295–298.)

The total alkaloids of the root exhibited prolonged hypotensive, bradycardiac and depressant action of the higher cerebral centres in several experimental animals.

A withanolide-free aqueous fraction isolated from the roots of Withania somnifera exhibited antistress activity in a dose-dependent manner in mice. (*Phytother Res* 2003, 531–6.)

(See also Simon Mills; *American Herbal Pharmacopoeia,* 2000; *Natural Medicines Comprehensive Database,* 2007.)

Dosage ► Root—3–6 g powder. (*API,* Vol. I.)

Withania coagulans Dunal.

Family ▶ *Solanaceae.*

Habitat ▶ Drier parts of Punjab, Gujarat, Simla and Kumaon.

English ▶ Vegetable Rennet, Indian Cheese-maker.

Unani ▶ Desi Asgandh, Kaaknaj-e-Hindi, Paneer, Paneer-band. Akri (fruit).

Siddha/Tamil ▶ Ammukkura.

Action ▶ Alterative, emetic, diuretic. Ripe fruits—sedative, CNS depressant, antibilious, emetic, antiasthmatic, diuretic, anti-inflammatory; used in chronic liver troubles and strangury. Dried fruits—carminative, depurative; used for dyspepsia, flatulence and strangury. Leaf—alterative, febrifuge. Seeds—anti-inflammatory, emetic, diuretic, emmenagogue.

Though known as Desi Asgandh, the root is not used in Indian medicine. Ashwagandhaa (Bengali) and Ashwagandhi (Kannada) are confusing synonyms of *W. coagulans.* In the market no distinction is made between the berries of *W. coagulans* and *W. somnifera.*

The berries contain a milk-coagulating enzyme, esterases, free amino acids, fatty oil, an essential oil and alkaloids. The amino acid composition fairly agrees with that of papain. The essential oil was active against *Micrococcus pyogenes* var. *aureus* and *Vibro cholerae;* also showed anthelmintic activity.

The withanolides, withacoagin, coagulan and withasomidienone have been isolated from the plant, along with other withanolides and withaferin. 3-beta-hydroxy-2,3- dihydrowithanolide E, isolated from the fruit showed significant hepatoprotective activity and anti-inflammatory activity equal to hydrocortisone. The ethanolic extract of the fruit showed antifungal and that of the leaves and stem antibacterial activity.

Woodfordia fruticosa Kurz.

Synonym ▶ *W. floribunda* Salisb.

Family ▶ *Lythraceae.*

Habitat ▶ Throughout North India, rather scarce in South India.

English ▶ Fire-flame Bush, Shiranjitea.

Ayurvedic ▶ Dhaataki, Dhaatri, Kunjaraa, Taamrapushpi, Bahupushpi, Vahnijwaalaa.

Siddha/Tamil ▶ Velakkai.

Action ▶ Dried flower—purifies blood, heals ulcers, astringent, prescribed in haemetemesis, erysipelas, dysentery, diarrhoea, menorrhagia, leucorrhoea. Flowers are used in alcohol-based tonics for fermentation (a yeast strain, saccharomyces cerevisiae, has been isolated). Bark—uterine sedative.

The Ayurvedic Pharmacopoeia of India recommends the flower in acute diarrhoea, haemorrhages, ulcerations and erysipelas.

The dried flowers are powdered and sprinkled over ulcers and wounds. The flowers also enter into an ointment used on pustules of smallpox.

In small doses the plant stimulates, while in large doses depresses the central nervous system.

The flowers and leaves gave polyphenols—ellagic acid, polystachoside and myricetin-3-galactoside. Flowers also gave anthocyanins—pelargonidin-3,5-diglucoside and cyanidin–3,5-diglucoside; octacosanol, chrysophanol-8-O-beta-D-glucopyranoside and beta-sitosterol. Hecogenin, mesoinositol and flavone glycosides—quercetin-3-rhamnoside, naringenin-7-glucoside and kaempferol, have been reported from flowers.

The bark contains C-glucoside, bergenin.

The flowers, leaves and bark contain tannins—24.1, 12–20 and 20–27% respectively. Dimeric hydrolyzable tannins—woodfordins A, B and C, and trimeric tannins woodfordin D and oenothein A and B have been isoalted from dried flowers. A new tannin monomer, isoschimawalin A and five oligomers—woodfordin E, F, G, H and I, have also been isoalted.

Oenothein A and B exhibited remarkable host-mediated antitumour activity. Woodfordin C and D also showed antitumour activity. Woodfordin C showed inhibitory activity toward DNA topoisomerase II.

Dosage ► Flower—3–6 g powder. (*API*, Vol. I.)

Wrightia tinctoria R. Br.

Family ► *Apocynaceae.*

Habitat ► A tree, found in Rajasthan, Madhya Pradesh and Tamil Nadu.

English ► Pala Indigo Plant.

Ayurvedic ► Shveta Kutaja. (white-flowered), Punkutaja, Indrayava (seeds).

Unani ► Inderjao Shireen.

Siddha/Tamil ► Irum-paalai, Nila-paalai.

Action ► Bark—antidysenteric. Also used in piles and skin diseases. Seeds—antidysenteric, astringent, febrifuge, anthelmintic. Bark and seeds—prescribed in flatulence and bilious affections.

Pods, without seeds, contain the cycloartanes, cycloartenone and cycloeucalenol along with alpha- and beta-amyrin, beta-sitosterol, ursolic acid, oleanolic acid and the terpene, wrightial. The leaves contain beta-amyrin. Stem bark gave beta-amyrin, beta-sitosterol and lupeol.

The seeds, leaves and roots have been shown to contain an indigo-yielding glucoside.

The flowers gave 3-O-rhamnoglucoside which exhibited significant anti-inflammatory activity in carrageenan-induced hind paw oedema.

The bark is commonly used as an adulterant of Kurchi Bark (obtained from *Holarrhena antidysenterica*).

Wrightia tomentosa Roem. & Schult.

Synonym ► *W. arborea* (Dennst.) Mabberley.

Family ► *Apocynaceae.*

Habitat ► Punjab, Rajasthan, Bihar, Assam and Western Peninsula.

Ayurvedic ► Kutaja (red-flowered). Indrayava (seeds).

Siddha/Tamil ► Pala.

Action ► Two varieties—male and female—are mentioned in Ayurvedic texts. Mostly, *Holarrhena* is supposed to be the male and *Wrightia* the female. In Unani medicine, Inderjao Talkh (bitter) is equated with *Holarrhena antidysenterica* (Conesse Bark) and Inderjao Shireen (sweet) with *Wrightia tinctoria* (known as Dyer's Oleander, Blue Dyeing Roseberry).

Dried bark is used as a substitute for *Holarrhena antidysenterica* bark. Alkaloid conessine is the active principle of both the barks.

Besides conessine, other alkaloids present in the bark are conessine dihydrate, holarrhine, kurchicine and a very minute quantity of conkurchine. The bark contains beta-sitosterol, lupeol, alpha-amyrin and reducing sugars besides alkaloids.

The isoflavone, wrightiadione, isolated from the stem bark, displayed cytotoxic activity. Two aliphatic compounds, *n*-tritriacont-16-one and hexaconsan-3, 6-diol-12-oic acid, have also been isolated from the bark.

See *Wrightia tinctoria* and *Holarrhena antidysenterica*.

X

Xanthium strumarium Linn.

Synonym ► *X. indicum* Koenig. ex Roxb.

Family ► *Compositae; Asteraceae.*

Habitat ► Tropical India.

English ► Cocklebur, Burweed.

Ayurvedic ► Shankheshwara, Arishta, Aartagala.

Siddha/Tamil ► Maruloomatham, Marlumutta.

Folk ► Bana-okraa.

Action ► Plant—used for leucoderma, ulcers, abscesses, strumous and malignant diseases.

Root—antitumour. Leaves and shoots—applied externally on venereal sores, herpes and scrofula.

Leaves contain seaquiterpene lactones—xanthinin, xanthumin, xanthanol and iso-xanthanol. Leaves also contain isohexacosane, chlorobutanol, stearyl alcohol, beta-sitosterol and palmitic acid. A highly toxic compound, carboxyatractyloside, has been isolated from the plant.

Beta-sitosterol glucoside is anti-inflammatory, xanthumin is a central nervous system depressant. Alcoholic solution of xanthinin shows strong antibacterial activity against Gram-negative bacteria and fungi. A cytotoxic compound, xanthatin (a seco-4,5-guaianolide) has been detected in the resin.

The root gave *n*-heptacosanol, stigmasterol, 3,4,-dihydro oxycinnamic acid, beta-sitosterol and its D-glucoside, and campesterol.

Xanthium spinosum Linn. (introduced from Europe into West Bengal and Assam), known as Spiny Clotbur, is used as a diuretic, antiperiodic (also in intermittent fevers), sudorific, antidiarrhoeal and styptic.

The whole plant gave several xanthanolides. The sesquiterpene lactones, xanthinin, solstitialin and stizolicin, isolated from the plant, demonstrated limited antitumour action *in vitro*. Xanthatin has also been isolated.

Ximenia americana Linn.

Synonym ► *X. spinosa* Salisb.

Family ► *Olacaceae.*

Habitat ► Both the Peninsulas and the Andaman Islands.

English ► Tallow-Wood, False Sandal-Wood.

Siddha/Tamil ► Chiru-illantai, Kadaranji, Siruyilandai.

Action ► Fruits—known as Wild Plum or Wild Olive, are used as a substitute for lemon. Fruits and seeds—laxative. Root and leaves—decoction given in jaundice, diarrhoea and during fevers. Root—used for venereal diseases. Bark—astringent, applied to sores. Wood—used as a substitute for sandalwood.

The root contains fat, rich in acetylenic acids, including ximenynic acid. The bark contains 17% tannin. An extract of leaves gave positive test for presence of free triterpenoids.

Alcoholic extract of the plant showed antiviral and hypotensive activity in primary tests on animals.

A cyanogenic and antimicrobial constituent, sambunigrin, is present in the plant. Natural lignified products from the plant significantly stimulate iodination of human peripheral blood polymorphonuclear cells.

The fruit contains 60.3 mg/100 g ascorbic acid.

Xylia xylocarpa (Roxb.) Taub.

Synonym ▶ *X. dolabriformis* Benth.

Family ▶ *Mimosaceae.*

Habitat ▶ Peninsular India.

Siddha/Tamil ▶ Irul.

Folk ▶ Jambu, Suriaa.

Action ▶ Bark—anthelmintic, antidiarrhoeal. Seed oil—antirheumatic. Bark and seed oil—antileprotic, used for ulcers and piles. A decoction of the bark powder is given with honey as a vermifuge.

The leaves contain beta-sitosterol and *t*-5-hydroxypipecolic acid which was shown to be an inhibitor of blood platelet aggregation.

The bark from South India gave tannin 17.1 and non-tans 11.1%; also contains triterpenes. The leaves contain 2.8% of tannins.

The seed yielded oil with oleic 21.5, linoleic 34.8, behenic 21.3 and lignoceric 10.2% fatty acids.

Xylocarpus granatum Koen.

Synonym ▶ *Carapa granatum* (Koen.) Alston.

Habitat ▶ Coastal regions of India, especially in Tamil Nadu.

Siddha/Tamil ▶ Somanthiri, Kanlolanyey.

English ▶ The Puzzle Fruit tree.

Folk ▶ Pussur, Dhundul.

Action ▶ Bark—astringent, antidysenteric, febrifuge.

The bark and leaves contain friedelin, beta-sitosterol, stigmasterol; tetranorterpenoids—oxomeliac derivatives. Bark, in addition, contains triacontanol. The heartwood contains beta-sitosterol and gedunin. Different parts of the plant contain tannins—fruit pulp 8.57, leaves 7.92, twig bark 14.82, branch bark 20.58, bole bark 23.73, branch wood 4.67 and bole wood 4.94%.

A closely related species *X.gangeticus* Prain occurs in West Bengal and the Andamans.

Xylopia parviflora Hook. f. Thoms.

Family ▶ *Annonaceae.*

Habitat ▶ Evergreen forests of Kerala up to an altitude of 600 m.

Folk ► Saanthu, Kalpottan (Kerala), Kalpootha, Chiddavintai (Tamil Nadu), ulli (Karnataka).

Action ► Root bark—antiseptic, used for ulcers. Root bark, flowers, fruits—used for oral hygiene.

Fruits of *Xylopia aromatica* are chewed with betel leaves; also used in cough and cold. The fruits, known as Suvaali Pippali, have no relationship with Pippali of Indian medicine.

The plant contains pinenes.

Xylosma longifolium Clos.

Family ► *Flacourtiaceae.*

Habitat ► Shady ravines of the Western Himalayas from Kashmir to Kumaon and on low hills up to an altitude of 1,500 m.

Folk ► Sallu (Kumaon), Sailu (Himachal Pradesh, North India), Dandal (North India), Katahaar (Assam).

Action ► An extract of young and tender leaves resembles opium in action and is used in Assam for intoxication. The herb exhibits antispasmodic, narcotic and sedative activity. It is prescribed in dysentery, restlessness and insomnia.

Xyris commplanata R. Br.

Synonym ► *X. anceps* HK. f.

Family ► *Xyridaceae.*

Habitat ► South India.

Folk ► Kochelachi-pullu (Kerala).

Action ► Herb—antiseptic. Bruised leaves and their juice, dried into powder and mixed with brandy, are used for ringworm, itches, leprosy and other skin diseases.

Xyris indica Linn.

Synonym ► *X. robusta* Mart.

Family ► *Xyridaceae.*

Habitat ► West Bengal, Assam and Western Peninsula, generally on sandy soils and salt marshes.

Ayurvedic ► Daadmaari, Dhobi Deeb.

Folk ► Haabiduuba (Bengal), Kochelachi-pullu (Malayalam).

Action ► Plant—used for ringworm, itches and leprosy.

Xyris pauciflora Willd. (marshy areas in Bihar, West Bengal and Tamil Nadu) is prescribed as a sedative for insomnia.

Y

Yucca aloifolia Linn.

Family ► *Liliaceae, Agavaceae.*

Habitat ► Common in gardens in warm tropical regions.

Action ► fruit—used as a purgative.

Flowers contain aloifoline. Seeds contain indole melanins. The leaves contain tigogenin (76%), sarsasapogenin, gitogenin, hecogenin, smilagenin, neotigogenin and samogenin.

Aloifoline is specifically active against Lewis lung-tumour as well as other transplanted mouse neoplasms.

Several spirostanol saponin glycosides from rhizomes and inflorescence have been isolated.

Yucca filamentosa Linn.

Family ► *Liliaceae; Agavaceae.*

Habitat ► Indigenous to southern United States; introduced into Indian gardens.

English ► Adam's Needle.

Action ► Rhizomes and leaves—used for the treatment of glandular and liver and gallbladder disorders; in bilious headaches accompanied by yellow tongue; in despondency and irritability. Root—tincture is used in the treatment of rheumatism; a poultice or salve is used in inflammations.

The leaves contain steroidal sapogenins sarsasapogenin, gitogenin, tigogenin, diosgenin, kammogenin, yuccagenin, hecogenin, manogenin, mexogenin, chlorogenin and smilagenin. The rhizomes contain mainly sarsasapogenin.

Tincture of the herb is used in Homoeopathic medicine for bilious symptoms with headache.

Yucca gloriosa Linn.

Synonym ► *Y. recurvifolia* Salisb.

Family ► *Liliaceae; Agavaceae.*

Habitat ► Native to Central America; introduced into India as a garden plant.

English ► Spanish Dagger-Plant, Adam's Needle.

Action ► Fruit—anti-inflammatory, blood purifier, cholagogue. Used in rheumatism, oedema, bronchitis, asthma and chest diseases; also for ulcers, sores, dysentery and haemorrhagic septicaemia.

Yuccas are an important source of steroidal sapogenins, precursors of sex-hormones and steroids. Related species, *Yucca bacata, Y. glauca,* and *Y. brevifolica,* are used for hormonal disturbances, menstrual disorders, varicose veins, arthritis and rheumatism.

Oxycanthin, extracted from Yucca plant, is used for the treatment of pruritus. It also stimulates hair growth.

The leaves of *Yucca gloriosa* contain sapogenins—titogenin derivatives, smilagenin, hecogenin, diosgenin, gloriogenin, 12-beta-hydroxysmilagenin and chlorogenin. Beta-sitosterol is also reported from leaves.

Essential oil from leaves contains *cis*-9-nonadecene and *cis*-8-heptadecene as major constituents.

Z

Zamia angustifolia Jacq.

Family ► *Cycadaceae.*

Habitat ► Native to tropical and sub-tropical America; introduced into Indian gardens.

Action ► Plant—toxic, insecticidal.

The leaves contain bilobetin, ginkgetin and sciadopitysin, which have been isolated from the leaves of *Ginkgo biloba* Linn. (Ginkgo extract is used for cerebral insufficiency and for improving mental performance in geriatric patients.) Other flavone compounds include amentoflavone, sequoiaflavone and amentoflavone derivatives.

Zanonia indica Linn.

Family ► *Cucurbitaceae.*

Habitat ► The peninsular India, khasi hills of Meghalaya and the Andamans.

Ayurvedic ► Chirpoti, Chirpotaa, Kuntali, Tiktaka.

Siddha/Tamil ► Penar-valli.

Folk ► Parpoti.

Action ► Fruits—cathartic, used for cough and asthma. Leaves—antispasmodic; topically applied to reduce inflammation and irritation. Plant—febrifuge.

Zantedeschia aethiopica (L.) Spreng.

Synonym ► *Richardia africana* Kunth.

Family ► *Araceae.*

Habitat ► Cooler parts of Bihar and Orissa.

Action ► Leaves—used as a poultice on sores, boils, wounds, burns, insect-bites and on painful parts of gout and rheumatism.

The plant contains an acrid juice which is poisonous and irritant; irritation is caused by raphides of calcium oxalate. A toxic principle has been reported from the inflorescence, spathe and flower stem. It produced effect in rabbits ranging from hypo-aesthesia to paralysis.

The flowers contain cytokinin along with swertisin, swertiajaponin, cyanidin, peonidin and ferulic acid.

Roasting and boiling appear to destroy the toxicity of leaves.

Zanthoxylum acanthopodium DC.

Family ► *Rutaceae.*

Habitat ► Sub-tropical Himalaya from Kumaon to Bhutan, and in Khasi hills.

Ayurvedic ► Tumburu.

Folk ► Nepaali Dhaniyaa, Timur.

Action ► Plant—uses similar to *Zanthoxylum armatum.*

The fruit gave tambulin and tambuletin. The stem bark contains lignans—sesamin, fargesin and eudesmin; triterpenoids—beta-amyrin and beta-amyrenone.

The seeds are extensively used in the preparation of tooth powders.

The essential oil from the seed (from Kanpur) contains *d*-linalool (37.6), dipentene+phellandrene (47), citral (6), esters as methyl cinnamate (6.2%) and free acids. Seeds from Sikkim contain 50% *d*-linalool.

Zanthoxylum armatum DC.

Synonym ► *Z. alatum* Roxb. *Z.* var. *planispinum* Sieb. & Zucc.

Family ► *Rutaceae.*

Habitat ► Jammu & Kashmir and Garhwal.

English ► Toothache tree, Indian Prickly Ash.

Ayurvedic ► Tumburu (fruit). Tejabala, Tejaswani, Tejohva, Tejovati (stem bark).

Unani ► Faaghir, Kabaab-e-Khandaan.

Siddha ► Tejyovathi.

Folk ► Nepaali Dhaniyaa.

Action ► Stem bark—used in cough, dyspnoea, hiccup, stomatitis, rheumatism. (*The Ayurvedic Pharmacopoeia of India.*) Stems and thorns—hypoglycaemic. Bark—used for cleaning teeth, also for treating diarrhoea. Fruits, seeds, bark—carminative, antispasmodic, anthelmintic. Fruits and seeds—used as a tonic in fever, dyspepsia and skin diseases. Essential oil of the fruit—antibacterial, antifungal and deodorant. Used in tooth powders.

The essential oil from dried fruits contains linalool (64.1%), linalyl acetate, citral, geraniol methyl cinnamate, limonene and sabinene.

Dried bark and branches contain lignans—sesamin, fargesin, eudesmin; a lactone pulviatide; dictamine, 8-hydroxydictamine and gamma-fagarine; magnoflorine and xanthoplanine. The root contains magnoflorine, xanthoplanine, skimmianine, dictamine and gamma-fagarine. Seeds contain flavonoids tambulin and tambulol.

Dosage ► Stem bark—10–20g for decoction; fruit—3–4 g. (*API,* Vol. II; Vol. IV.)

Zanthoxylum americanum Mill.

Family ► *Rutaceae.*

Habitat ► Canada and North America.

English ► Toothache tree, Prickly Ash.

Action ► Bark, berries—used internally and externaly to treat rheumatism and toothache; also for circulatory insufficiency and fevers.

The bark contains alkaloids gamma-fagarine, beta-fagarine, magnoflorine, laurifoline, nitidine, chelerythrine, tembetarine, candicine; coumarins include xanthyletine, xanthoxyletin and alloxanthyletin.

Related species, found in India, give more or less similar pattern of chemical constituents and therapeutic activities. The bark of *Z. armatum* is used for cleaning teeth. The seeds of *Z. acanthopodium* are extensively used in the preparation of tooth-powders. The fruits of *Z. budrunga* and the root of *Z. nitidum* are prescribed for toothache.

Zanthoxylum budrunga
Wall. ex DC.

Synonym ► *Z. limonella* (Dennst.) Alston.
Z. rhetsa DC.
Fagara budrunga Roxb.
F. rhetsa Roxb.

Family ► *Rutaceae.*

Habitat ► Meghalaya, foothills of Assam and Peninsular India.

Ayurvedic ► Tumburu (Kerala), Ashvaghra, Tejabala.

Siddha/Tamil ► Tratechai.

Action ► Fruits—used for diarrhoea, dyspepsia; asthma, bronchitis; rheumatism; diseases of the mouth and teeth. Pericarp—astringent, digestive, stimulant. Essential oil—disinfectant, used in infective dermatosis. Bark—cholinergic, diuretic, hypoglycaemic, spasmolytic. Root—emmenagogue, febrifuge.

The trunk-bark from Assam gave alkaloids—chelerythrine (0.014%), evodiamine (0.03%) and hydoxyevodiamine (0.05%). The essential oil from the fruit contains *l*-sabinene, alpha-terpinene, beta-phellandrene, 1,4-cineole, decanal, octanal, terpinen-4-ol, dihydrocarveol, *l*-cryptone and cuminaldehyde.

The essential oil exhibits anti-inflammatory, anaesthetic and antagonisic activity.

Z. nitidum (Roxb.) DC. (Bihar eastwards to Sikkim and Assam) is known as Tezmul in Assam. The root is used in toothache and stomachache.

The plant is used as one of the ingredients in the preparation of pharmaceutical tablets given to drug addicts for the treatment of withdrawl symptoms.

Methanolic extract of the roots gave nitidine, chelerythrine and isogaridine. The extract showed antitumour property.

Z. ovalifolium Wight (Eastern Himalayas, Meghalaya, the Western Ghats of South Kanara and Kerala) is known as Armadalu in Karnataka and Diang-shih in Meghalaya (Khasi Hills). The leaf contains diosmetin and the heartwood contains flavonoids of dihydrofisetin and cinnamaldehyde. The bark and fruit possess properties similar to other species of the genus.

Zanthoxylum oxyphyllum
Edgew.

Synonym ► *Xanthoxylon violaceum* Wall.
Fagara oxyphylla (Edgew.) Engl.

Family ► *Rutaceae.*

Habitat ► The Himalayas from Garhwal to Bhutan at 1,800–2,700 m, and in Khasi Hills at 1,200–1,800 m.

Folk ► Mezenga (Assam); Timur, Bhansi (Nepal).

Action ► Bark—stimulant, stomachic, sudorific; used in colic; also administered in fevers. Fruits—prescribed for dyspepsia, also for asthma, bronchitis, rheumatism and toothache.

Alkaloids, xanthoxyphyllin and corydine and a lactone 3,5-bis furan 2-one have been isolated from the roots. Stem bark gave zanoxyline and rhetsinine. Dried branches with bark gave lignans (sesamin, eudesmin and *epi*-eudesmin), fluoroquinolone alkaloid gamma-fagarine, triterpenoid lupeol, beta-sitosterol and syringaresinol.

Zataria multiflora Boiss.

Family ► *Labiatae.*

Habitat ► Iran, Afghanistan and Pakistan. Imported into India.

English ► Wild Thyme.

Unani ► Saatar Faarsi, Al-Saatar, Origanon.

Action ► Herb—stimulant, anti-inflammatory, anodyne, diaphoretic, diuretic, emmenagogue, anthelmintic, antilithic. Detoxifies liver, stomach and intestines. Used for inflammatory conditions of the liver.

Essential oil contained phenols 69% (consisted mainly of carvacrol and traces of thymol) and nonphenols 31% (including *p*-cymene, cineol, borneol, zatarinol). Besides essential oil, the drug contains alkanes, beta-sitosterol, betulin, fatty acids and triterpenic ketones.

Zea mays Linn.

Family ► *Gramineae; Poaceae.*

Habitat ► Native to South America. Grown as a food crop mainly in Uttar Pradesh, Punjab, Madhya Pradesh, Bihar, Andhra Pradesh and Jammu and Kashmir.

English ► Maize, Corn, Indian Corn.

Ayurvedic ► Mahaa-Kaaya.

Unani ► Makkaa, Zurraa Makkaa.

Action ► Corn Silk—diuretic, urinary demulcent, antilithic. Used for cystitis, urethritis, prostatitis, irritation of the urinary tract by phosphatic and uric acids, nephritis, uncontrollable bladder, retention, pus in the urine, bed-wetting.

The corn silk gave saponins; alantoin; sterols, especially beta-sitosterol and stigmasterol; alkaloid hordenine; polyphenols; mucilage; potassium; vitamin C and K; cryptoxanthin, anthocyanins, plant acids, tannin.

The glycoproteins, seperated from corn silk, inhibited IgE antibody formation and enhanced IgG and IgM formation; they showed antiviral and antitumour activities.

Zehneria umbellata Thw.

Synonym ► *Melothria heterophylla* (Lour.) Cogn.
Solena heterophylla (Lour.) Cogn.

Family ► *Cucurbitaceae.*

Habitat ► Throughout India ascending up to 2,100 m.

Siddha/Tamil ► Pulivanji.

Folk ► Tarali. Gometi (Maharashtra). Banakakaraa (Punjab). Kudri (Bengal).

Action ► Root—used for dysuria and spermatorrhoea. Leaves—topically applied to skin inflammation.

The seed contains linolenic and oleic acids; the root gave columbin.

Zingiber cassumunar Roxb.

Synonym ► *Z. montanum* (Koen.) Link ex. A. Dietr.
Z. purpureum Rosc.

Family ► *Zingiberaceae.*

Habitat ► Wild throughout India, also cultivated in tropical parts of India.

English ► Cassumunar Ginger.

Ayurvedic ► Vanardraka, Peja, Peyu, Aardikaa, Shringaberikaa.

Folk ► Adarakhi, Bana-adarakhi.

Action ► Rhizome—carminative, stimulant, antispasmodic. Used for diarrhoea and colic.

The occurance of an active diastase in the rhizome has been reported. The enzyme resembles in its activity with alpha-amylase of *Aspergillus oryzae.* The rhizome gave an essential oil consisting of terpinen-4-ol (about 35%); other constituents are alpha- and beta-pinene, sabinene, myrcene, terpinene, limonene, *p*-cymene and terpinolene. The fresh rhizomes contain phenyl butenoic dimers, along with cyclohexane derivatives. Hexane extract of the rhizome contained (E)-4-(3′4′-dimethoxyphenyl)-but-3-en-1-ol, known as compound D. Compound D showed antispasmodic effect on guinea-pig ileum and tracheal smooth muscle, also a dose-related uterine relaxant effect *in situ* in non-pregnant rats; in pregnant rats the response varied with the period of pregnancy. Aqueous extract of the rhizome showed smooth muscle relaxant and anti-inflammatory activity. Antioxidant activity was found to be more intense than that of known curcuminoid antioxidants. It is attributed to cassumunin A.

Zingiber officinale Rosc.

Family ► *Zingiberaceae.*

Habitat ► Native to Southeast Asia; now cultivated mainly in Kerala, Andhra Pradesh, Uttar Pradesh, West Bengal, Maharashtra.

English ► Ginger.

Ayurvedic ► Fresh rhizome—Aardraka, Aadrikaa, Shrngibera, shrngavera, Katubhadra. Dried rhizome—Shunthi, Naagara, Naagaraa, Naagaraka, Aushadha, Mahaushad-

ha, Vishvaa, Vishvabheshaja, Vishvaaushadha.

Unani ► Fresh rhizome—Zanjabeel-e-Ratab, Al-Zanjabeel. Dried rhizome—zanjabeel, Zanjabeel-e-yaabis.

Siddha ► Fresh rhizome—Inji, Allam, Lokottai. Dried rhizome—chukku, Sunthi.

Action ► Rhizome—antiemetic, antiflatulent, hypocholesterolaemic, anti-inflammatory, antispasmodic, expectorant, circulatory stimulant, diaphoretic, increases bioavailability of prescription drugs. Used for irritable bowel and diarrhoea, colds and influenza. Showed encouraging results in migraine and cluster headache (*J Ethnopharmacol,* 1990, 29, 267–273; *Aust J Med Herbalism,* 1995, 7/3, 69–78; *Natural Medicines Comprehensive Database,* 2007.) *The Ayurvedic Pharmacopoeia of India* recommends dried rhizomes in dyspepsia, loss of appetite, tympanitis, anaemia, rheumatism, cough and dyspnoea; fresh rhizomes in constipation, colic, oedema and throat infections.

Key application ► For dyspepsia and prevention of motion sickness (*German Commission E*); vomiting of pregnancy, anorexia, bronchitis and rheumatic complaints (*The British Herbal Compendium*); as a post-operative antiemetic. (*ESCOP*).

The rhizome contains an essential oil containing monoterpenes, mainly geranial and neral; and sesquiterpenes, mainly beta-sesquiphellandrene, beta-bisabolene, ar-curcumene and alpha-zingiberene; pungent principles, consisting of gingerols, shogaols and related phenolic ketone derivatives. Other constituents include diarylheptenones, diterpenes, gingesulphonic acid and monoacyldigalactosyl glycerols.

Gingerol and shogaol have been shown to suppress gastric contractions. Both fresh and dried rhizomes suppress gastric secretion and reduce vomiting. Gingerol and shogaol have gained importance due to their sedative, anti-inflammatory, antipyretic, analgesic, hypotensive and hepatoprotective activities.

Cardiotonic effects of ginger has been attributed to 6-and 8-shagaols and gingerols. (Antithrombotic effects remain unconfirmed.) Antimigraine effect is due to ginger's ability to decrease platelet aggregation. It also acts as a potent inhibitor of prostaglandins which enhance release of substance P from trigeminal fibers. (*PDR,* 2004.)

Indian ginger is considered only second to Jamaican in quality.

There are three main types of Indian ginger—Cochin ginger (light brown or yellowish grey; Calicut ginger from Malabar (orange or reddish brown, resembling African ginger) and Kolkata ginger (greyish brown to greyish blue).

Zingiber zerumbet Rosc. ex.Sm.

Synonym ► *Z. spurium* Koen.
Amomum spurium Gmel.
A. sylvestre Poir.

Family ► *Zingiberaceae.*

Habitat ► Throughout India from the Himalayas, southwards. Cultivated in Asian tropics.

English ► Zerumbet Ginger.

Ayurvedic ► Mahaabhari-vachaa (also equated with *Alpinia galanga*), Sthula-granthi (also equated with *Alpinia speciosa*). Source of Martinique Ginger, used as Shunthi in Indian medicine.

Unani ► Narkachoor, Zarambaad. (*Curcuma caesia* is also equated with Narkachoor.)

Folk ► Karrallamu (Telugu).

Action ► Rhizomes—used for cough, asthma; colic; intestinal worms, and in leprosy and skin diseases. Oil—antiseptic.

The rhizome contains several flavonoid glycosides and curcumin.

The oil of Zerumbet contains about 13% monoterpenes and several sesquiterpenes of which humulene and zerumbone are major constituents. The major constituent of monoterpenes is camphene. Unlike the oil of *Z. officinale,* Zerumbet oil does not contain any methyl heptanone; instead, it contains camphor.

Zerumbone inhibits the growth of *Micrococcus pyogenes* var. *aureus* and *Mycobacterium tuberculosis.*

Indian samples contain only 37.5% of zerumbone, while those from Fiji 58.7, Vietnam 72.3 and Tahiti 65.3%.

Zizania caduciflora Hand.-Mazz.

Family ► *Gramineae; Poaceae.*

Habitat ► North-east India (as an aquatic grass). (It forms an important parat of the floating grass island in Logtak Lake, Manipur.) Cultivated in China.

English ► Zizania.

Action ► Clums, rhizomes, grains—used in China against anaemia and fevers, also for heart, kidney and liver affections. The herb exhibits diuretic activity; leaves are rich in vitamin C (142 mg/100 g).

Ziziphus jujuba (Lam.) Gaertn. non-Mill.

Synonym ► *Z. mauritiana* Lam. *Rhamnus jujuba* L.

Family ► *Rhamnaceae.*

Habitat ► Throughout India and in the outer Himalayas up to 1,350 m.

English ► Indian Jujube, Common Jujube.

Ayurvedic ► Badar, Kola.

Unani ► Ber.

Siddha ► Handai.

Action ► Fruits—wild var.: astringent, anodyne, cooling, stomachic, styptic. Ripe and dry cultivated var.: mild laxative, expectorant. Seeds—antidiarrhoeal. Kernels—antispasmodic, sedative, antiemetic. Leaves—astringent and diaphoretic. Stem bark—astringent, used in diarrhoea. Root bark—juice purgative, externally applied to rheumatic inflammations and gout. Leaves and twigs—paste applied to

abscesses, boils and carbuncles and in strangury.

Leaves gave protopine and berberine; exhibited anticholinergic activity. Fruits gave cyclic AMP and cyclic GMP, Sisyphus saponins I, II and III; jujuboside B and *p*-coumaroylates of alphitolic acid. Seeds gave saponins—jujubosides A and B; the saponin yields the sapogenin—jujubogenin.

A variety grown in Haryana (Naazuka) contains sugars 10.5% and ascorbic acid 205 mg/100 g.

Dosage ► Dried fruit pulp, devoid of seed—3–6 g; stem bark—3–5 g powder, 10–20 g for decoction. (*API,* Vol. III.)

Ziziphus jujuba Mill.

Synonym ► *Z. sativa* Gaertn. *Z. vulgaris* Lam.

Family ► *Rhamnaceae.*

Habitat ► Native to North China. Also found in Punjab, Himachal Pradesh, up to 1,950 m, eastwards to West Bengal.

English ► Chinese Tsao.

Unani ► Unnaab.

Action ► Fruit—a nourishing, tonic, emollient, antitussive, antiallergic; protects liver and prevents stress ulcer formation. Seed—used for dry cough and skin eruptions. Kernel—used in insomnia. Bark—used for ulcers and wounds.

The leaves contain the flavonoids, 3-O-glucosides, rutinosides and diglucosides of quercetin, rhamnetin and eriodictyol, also C-glucosides. The bark yields cyclopeptide alkaloids—sativanines A, B, C-G; also alkaloids—frangulanine, nummularine B and mucronine D. The berries gave saponins of dammaran type, known as Sisyphus saponins; jujubosides, zizybeosides and zizyvyosides, together with pentacyclic triterpenoids. Flavonoids include naringenin glycosides, vomifoloil and roseoside. (Also see *WHO* monograph.)

Antiallergic activity is due to high levels of both cyclic AMP and cyclic GMP in the fruit extract. Sedative activity and *in vitro*antitumour activity has been shown experimentally. Seed extract produces a transient fall in blood pressrue and a prolongation of thiobarbital-induced sleeping time in animals.

Ziziphus nummularia (Burm. f) Wight & Arn.

Synonym ► *Z. rotundifolia* Lam. *Rhamnus nummularia* Burm. f.

Family ► *Rhamnaceae.*

English ► Wild Jujube.

Ayurvedic ► Karkandhu.

Unani ► Jharber, Sadarber.

Action ► Fruit—cooling and astringent. Prescribed for bilious affections. Leaves—used in scabies and other skin diseases.

The root bark contains 12% of tannin and cyclopeptide alkaloids—nummularines A, B and C, mucronine D

and amphibine H. The leaves contain ascorbic acid. Nummularine M, R and S, besides frangufoline have been isolated from the stem bark. Nummularine R and S showed antibacterial activity against Gram-negative bacteria, while frangufoline was active against both Gram-negative and Gram-positive bacteria. The alkaloid fraction, obtained from the bark, showed significant analgesic activity.

Ziziphus oenoplia Mill.

Synonym ▶ *Rhamnus oenoplia* L.

Family ▶ *Rhamnaceae.*

Habitat ▶ North India and both the Peninsulas.

English ▶ Jackal Jujube.

Ayurvedic ▶ Laghu-badara, Shrgaala-badari.

Siddha/Tamil ▶ Soorai.

Action ▶ Fruits—stomachic. Root—given for hyperacidity and ascaris infection.

Stem bark and root bark contain cyclopeptide alkaloids—zizyphines A, B, C, D, E, F and G, and zizyphinine. The bark contains 12% tannin.

Aerial parts exhibit diuretic and hypotensive activity.

Ziziphus rugosa Lam.

Family ▶ *Rhamnaceae.*

Habitat ▶ Sub-Himalayan tract from Kumaon eastwards, Bihar, Assam, in Central and South India.

Siddha/Tamil ▶ Charai Kattu Ilandai, Kottaimaram, Todari.

Folk ▶ Churnaa, Sekaraa (Bihar); Torana (Gujarat).

Action ▶ Bark—astringent, antidiarrhoeal. Flowers—used in prescriptions for menorrhagia. Stem and fruit—hypotensive.

The bark contains vanillic acid, betulin, betulinic acid, kaempferol, quercetin, myricetin, apigenin and apigenin-7-O-glucoside. The bark also contains several N-formyl cyclopeptide alkaloids.

The triterpene saponins isolated from the bark showed CNS depressant, tranquilizing and analgesic activity in albino rats and produced no hepatotoxicity. The cyclopeptide alkaloids of the plant show antibacterial as well as antifungal activity.

Ziziphus trinervia Roxb.

Synonym ▶ *Z. glabrata* Heyne ex Roth.

Family ▶ *Rhamnaceae.*

Habitat ▶ Gujarat, Western Ghats of Tamil Nadu and Kerala at low elevations.

English ▶ Jagged Jujube.

Siddha/Tamil ▶ Karakattam.

Action ▶ Leaf—depurative; employed to purify blood and as an alterative in chronic venereal affections.

Ziziphus xylopyra Willd.

Family ▶ *Rhamnaceae.*

Habitat ► Lac host in Madhya Pradesh, Uttar Pradesh and Punjab.

Ayurvedic ► Ghontaa, Ghonta-Phala. (Rangeeni lac is recovered from the tree.)

Siddha ► Kottei. Kombarakku (lac).

Action ► Astringent.

Fruit contains catechol-type tannins (8–12%), bark contains 7.2% tannins.

Alcoholic extract of the bark possesses anti-nociceptive, anti-convulsant and anti-inflammatory properties. The plant contains alkaloids, amphibine H and nummularine K. Both the alkaloids showed significant antimicrobial activity.

Host plant of *Laccifer* sp. (*L. indicola* Kapur, synonym *L. indica* Misra and *L. jhansiensis* Misra) is *Z. mauritiana* Lam. in Bihar and Jhansi (Uttar Pradesh). Lac is styptic, used in haematemesis; promotes tissue regeneration and wound healing. Applied to carries and diseased dentition.

Zornia diphylla (L.) Pers.

Family ► *Papilionaceae; Fabaceae.*

Habitat ► Throughout plains of India, ascending up to 1,200 m in Kumaon.

Folk ► Samraapani (Gujarat), Dupatiyaa.

Action ► Herb—used for the treatment of dysentery. Root—given to induce sleep.

The herb, collected at the flowering stage from Mumbai, contained silica 3.87, calcium 1.02, magnesium 1.00, potassium 0.53, phosphorus 0.18%; iodine content 0.026–00.049 ppm (dry-matter basis).

Zosima orientalis Hoffm.

Synonym ► *Z. absinthifolia* Link.

Family ► *Umbelliferae; Apiaceae.*

Habitat ► West Asia. Recorded from Maharashtra.

Action ► Herb—used for cough and bowel disorders.

The fruits and roots yield a mixture of coumarin lactones, 1.5% and 3.2% respectively; these include two isomeric dihydrofurocoumarins—zosimin and deltonin. On saponification, zosimin yielded a hydroxyacetone called zosimol and *cis*-2,3-dimethyl acrylic acid. It showed antitumour activity against Ehrlich ascites cells *in vitro*.

Herbal cheese is prepared from the fresh leaves and stems in Turkey.

Zygophyllum simplex Linn.

Family ► *Zygophyllaceae.*

Habitat ► Arid and sandy tracts of Punjab, Rajasthan and Gujarat.

Folk ► Alethi (Punjab), Lunio, Lunwaa (Rajasthan).

Action ► Leaves and seeds—an infusion is applied to the eyes in ophthalmia and glucoma. Seeds—anthelmintic.

An acylated glycoside was isolated from aerial parts. Isorhamnetin, its 3-O-glucoside, kaempferol-3-O-rutinoside, sitosterol glucoside and quinovic acid-3 alpha-L-rhamnoside were present in the herb.

An infusion of the leaves acts as a skin cleanser. The plant contains free ascorbic acid. The leaves and fruits contain kaempferol; quercetin (0.10 mg/g dry weight) is present in fruits.

Appendix

Abbreviations

5-HT	5-hydroxytryptamine
ACE	Angiotensin converting enzyme
ACTH	Andrenocorticotrophic hormone
AFI	*The Ayurvedic Formulary of India* Revised English Edition
API	*The Ayurvedic Pharmacopoeia of India*, Part I, Volume I 1989, Volume II 1999, III 2001, IV 2004.
Aq.	Aqueous
BP	Blood pressure
British Herbal Compendium	Ed. Bradley PR., published by British Herbal Medicine Association, 1992.
British Herbal Pharmacopoeia	Published by British Herbal Medicine Association, Exeter, UK., 1996.
bw.	Body weight
CCRAS	*Central Council for Research in Ayurveda and Siddha*, New Delhi. *Standard Nomenclature of Ayurvedic Medicinal Plants.*
CCRUM	*Central Council for Research in Unani Medicine*
CIMAP	*Central Institute of Medicinal and Aromatic Plants*, Lucknow. Dictionary of Indian Medicinal Plants, Akhtar Husain et al., 1992.
cm	Centimeter
CNS	Central nervous system
CVS	Cardiovascular system
d	Day(s)
DOPA	Dihydroxyphenylalanine
ECG	Electrocardiogram

E. coli	Escherichia coli
ESCOP	European Scientific Cooperative on Phytotherapy. Completely revised second edition.
ESR	Erythrocyte sedimentation rate
EtOH	Ethyl alcohol
Ext	Extract
g	Gram
g/kg	Grams per kilogram
GABA	Gamma aminobutyric acid
German Commission E	Monographs (1998) and expanded monographs (2000) published by American Botanical Council.
GIT	Gastrointestinal tract
GOT	Glutamic-oxaloacetic transaminase
GPT	Glutamic-pyruvic transaminase
Hb	Haemoglobin
HDL	High density lipoprotein
ICMR	*Indian Council of Medical Research*, New Delhi
Ig.	Immunoglobulin
i.m.	Intramuscular
i.p.	Intraperitoneal
i.v.	Intravenous
IHD	Ischaemic heart disease
IU	International units
KCal	Kilocalorie
l	Litre
LD50	Median lethal dose
LDL	Low density lipoproteins
L-Dopa	L-3,4-Dihydroxyphenylalanine
LH	Luteinizing hormones
mcg	Microgram
mg	Milligram

min	Minimum
min	Minute(s)
ml	Millilitre, 20 drops of water, 1 cc
mm	Millimetre
mp.	Melting point
No.	Number
PDR	PDR for Herbal Medicines, Third Edition, 2005, Published by Thomson PDR, Montvale.
pet.	Petroleum
po	Per oral
ppm	Parts per million
sc	Subcutaneous
SGOT	Serum glutamic-oxaloacetic transaminase
SGPT	Serum glutamic-pyruvic transaminase
Sh	Shigella
sp./spp.	(one) (several) species
Staph.	Staphylococcus
Strept.	Streptococcus
tsp	1 heaped teaspoonful: 3 gram 1 levelled teaspoonful: 1.5 gram or 4 ml
tbsp	1 tablespoonful: 3 tsp. or 15 ml
UTI	Urinary tract infection
UV	Ultraviolet
v.	Volume
VD	Venereal diseases
VLDL	Very low density lipoproteins
Vib.	Vibro
w/w	Weight per weight
WHO	Monographs on Selected Medicinal Plants Vol. 1,2,3.
wk.	Week
wt.	Weight

Commission E, ESCOP, WHO, The Ayurvedic Pharmacopoeia of India

In 1978, German Federal Health Agency (now called the Federal Institute for Drugs and Medical Devices) established an expert committee on herbal remedies (called *Commission E*). The *Commission E* is composed of 24 members, including physicians, pharmacists, non-medical practitioners, pharmacologists, toxicologists, biostatisticians, and representatives of the pharmaceutical industry. Fifty percent are experts from clinical/therapeutic field. There are 13 full university professors on the Commission. The interdisciplinary nature of *Commission E* is unique in the world. The safety and efficacy of over 380 herbs have been assessed by the Commission.

Since 1995, the *Commission E* has not issued any new monographs. Data from studies published subsequent to the *Commission E* monographs is now used for the preparation of *ESCOP* (European Scientific Cooperative on Phytotherapy) monographs. Fully revised and updated 80 monographs have been published by *ESCOP* in its first bound edition in 2003. This is the culmination of 14 years work by the *ESCOP* Scientific Committee involving about 50 committee delegates from 15 European countries. Members of *ESCOP* include experts from Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and United Kingdom.

The World Health Organization (*WHO*) published *Guidelines for the Assessment of Herbal Medicines* in 1991. Subsequently, The *WHO* Monographs on *Selected Medicinal Plants*, Vol 1 was published in 1999 and Vol 2 in 2003. Vol. 3 is the latest addition. These volumes contain 28, 29 and 31 monographs respectively.

American Botanical Council, Austin, Texas 78714-4345, published *The Complete German Commission E Monographs* (1998) and *Herbal Medicine—Expanded Commission* E *Monographs* (2000).

First bound edition of *ESCOP* monographs has been published by *ESCOP*, Argyle House, Gandy Street, Exeter EX4 3LS, UK, in collaboration with George Thieme, Germany and Thieme, 333 Seventh Avenue, New York, NY 10001, USA.

WHO monographs, published by *The World Health Organization*, Geneva, Switzerland, are available worldwide through its regional offices.

The Ayurvedic Pharmacopoeia of India, Part I, Vol. I was brought out in 1989, Vol. II in 1999, Vol. III in 2001 and Vol. IV in 2004. These volumes cover 80,78,100 and 68 single herbs, respectively.

The working format of laying down the standard on single drugs of plant origin was prepared more or less on the pattern of *Indian Pharmacopoeia* (*IP*), *British Pharmacopoeia* (*BP*) and *United States Pharmacopoeia* (*USP*), but "properties and action" of the herbal drug are not evidence based. These are based on scriptural references and traditional applications of classical polyherbal formulation, and on the Ayurvedic concepts.

Following explanation has been given in Vol. I:

"Since the effort is to compile pharmacopoeial monographs of Ayurvedic drugs, the accent on classical attributes of respective drugs according to the doctrine of *Rasa*, *Guna*, *Veerya*, *Vipaaka* and *Karma* has not been lost sight of, *though some of them appear to be abstract and subjective in the absence of an established experimental methods to qualify them*." (Same explanation has been given in Vol. IV.)

Rasa, *Guna*, *Veerya*, *Vipaaka* and *Karma*, as well as therapeutic uses of the herbal drug have been given in Sanskrit (Roman script).

Non-Ayurvedic readers are advised to refer to the Second Revised English Edition of The *Ayurvedic Formulary of India*, Part I, 2003, for approximate English equivalents of diseases and technical terms mentioned in *The Ayurvedic Pharmacopoeia of India*. Therapeutic uses and important formulations in the *Pharmacopoeia* have been quoted from the recognized Ayurvedic classics (in Sanskrit).

The *Ayurvedic Pharmacopoeia of India* is a legal document and every licensed manufacturer of Ayurvedic medicines will have to comply with the standards prescribed in it.

Divergent Plant Sources of Important Classical Herbs

PLANT DRUG	ACCEPTED SOURCE	OTHER SOURCES
Agaru	*Aquilaria agallocha* (*Thymelaeaceae*)	South India: *Dysoxylum malabaricum* (*Meliaceae*)
Bhaarangi	*Clerodendrum serratum* (*Verbanaceae*)	South India: *Premna herbacea* (*Verbanaceae*) Bengal: *Picrasma quassioides* (*Simarubaceae*)
Bhuunimba Kiraatatikta	*Swertia chirata* (*Gentianaceae*)	South India: *Andrographis paniculata* (*Acanthaceae*)
Daaruharidraa	*Berberis aristata* (*Berberidaceae*)	South India: *Coscinium fenestratum* (*Menispermaceae*)
Duraalabha/ Dhanvayaasa	*Fagonia cretica* (*Zygophyllaceaea*)	South India: *Tragia involucrata* (*Euphorbiaceae*)
Hapushaa/ Havushaa	*Juniperus communis* (*Pinaceae*)	South India: *Sphaeranthus indicus* (*Asteraceae*)
Jivanti	*Leptadenia reticulata* (*Asclepiadaceae*)	South India: *Holostemma rheedei* (*Asclepiadaceae*)
Muurvaa	*Marsdenia tenacissima* (*Asclepiadaceae*)	South India: *Chonemorpha macrophylla* (*Apocynaceae*) *Sansevieria roxburghiana* (*Liliaceae*) (IMPCOPS, Chennai)
Naagakeshara	*Mesua ferrea* (*Clusiaceae*)	South India: *Calophyllum inophyllum* (*Clusiaceae*) Tamil Nadu: *Cinnamomum wightii* (*Lauraceae*) and *Dillenia pentagyna* (*Dilleniaceae*) fruits
Paashaanabheda	*Bergenia ligulata* (*Saxifragaceae*) Substitute: *Aerva lanata* (*Amaranthaceae*)	South India: *Rotula aquatica* (*Boraginaceae*), *Homonoia riparia* (*Euphorbiaceae*) Gujarat: *Iris pseudacorus* (*Iridaceae*)
Prasaarini	*Paederia foetida* (*Rubiaceae*)	South India: *Merremia tridentata* (*Convolvulaceae*) (An altogether different plant)
Priyangu	*Callicarpa macrophylla* (*Verbenaceae*) Substitute: *Prunus mahaleb* (*Rosaceae*)	South India: *Callicarpa tomentosa* (*Verbenaceae*); *Zanthoxylum rhetsa* (*Rutaceae*); *Aglaia roxburghiana* fruits (*Meliaceae*); *Myristica malabarica* (*Myristicaceae*) dried flowers (IMPCOPS, Chennai)
Prishniparni	*Uraria picta* (*Fabaceae*)	South India: *Pseudarthria viscida* (*Fabaceae*) Kerala: *Desmodium gangeticum* (*Papilionaceae*)

PLANT DRUG	ACCEPTED SOURCE	OTHER SOURCES
Raasnaa	*Pluchea lanceolata* (*Asteraceae*) Substitute: *Alpinia galanga* (*Zingiberaceae*)	South India: *Alpinia calcarata* and *Alpinia galanga* (*Zingiberaceae*) Andhra Pradesh: *Dodonaea viscosa* (*Sapindaceae*) Eastern India: *Vanda roxburghii* (*Orchidaceae*) Bihar: *Lepidagathis trinervis* (*Acanthaceae*) Madhya Pradesh: *Blepharispermum subsessile* (*Compositae*)
Renukaa	*Vitex agnus-castus* (*Verbenaceae*)	South India: *Vitex altissima*, *Vitex negundo* (*Verbenaceae*) In South India, fruits of *Vitex* spp. are sold as Arenuka. Fruits of *Piper aurantiacum* (*Piperaceae*) are used as Harenukaa/Renukaa. (IMPCOPS, Chennai.)
Sahachara	*Barleria prionitis* (*Acanthaceae*)	South India: *Niligirianthus ciliatus*, (*Acanthaceae*) Kerala: *Ecbolium viride* (Nila Sahachara), *Justica betonica* (Shveta Sahachara) (*Acanthaceae*)
Saarivaa	*Hemidesmus indicus*	South India: *Decalepis hamiltonii*;
Shveta Saarivaa	(*Asclepiadaceae*)	*Cryptolepis buchanani* (*Asclepiadaceae*); *Ichnocarpus frutescens* used as Krishna Saarivaa (*Apocynaceae*) Kerala, Tamil Nadu, Karnataka: *Decalepis hamiltonii* (*Asclepiadaceae*)
Shati	*Hedychium spicatum* (*Zingiberaceae*)	South India: *Kaempeferia galanga*, *Curcuma zedoaria* (*Zingiberaceae*)
Shankhapushpi	*Convolvulus pluricaulis* (*Convolvulaceae*)	South India: *Evolvulus alsinoides*, *Clitoria ternatea* (*Convolvulaceae* and *Fabaceae* respectively) Bengal: *Canscora decussata* (*Gentianaceae*), *Lavandula bipinnata* (*Labiateae*; *Lamiaceae*)
Shringi Karkatashringi	*Pistacia integerrima* (galls) (*Anacardiaceae*)	South India: *Rhus semialata* galls, *Rhus succedanea* galls (*Anacardiaceae*).
Vidhaari	*Pueraria tuberosa* (*Fabaceae*)	South India: *Adenia hondala* (*Passifloraceae*); *Ipomoea paniculata* (*Convolvulaceae*); *Cycas circinalis* (*Cycadaceae*)

Accepted Sources: Based on Appendix of *Ayurvedic Formulary of India*, 2003.
Other sources: Based on *Ayurvedic Drugs and their Plant Sources*, V V Sivarajan and Indira Balachandran, 1994; *Formulary of Ayurvedic Medicines*, IMPCOPS, Chennai, 1987; K. Vasudevan Nair et al., *Ancient Sc Life*, 5(1): 49–53, 1985; *Plants of Bhava Prakash* and *Medicinal Plants used in Ayurveda*, Rashtriya Ayurveda Vidyapeeth, 1999, 1998.

Important Herbs of Non-Indian Origin used in Unani system of Medicine

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Achillea millefolium	Baranjaasif	Yarrow, Milfoil	Eurasia, North America, temperate zones	Pakistan
Agaricus albus	Ghaariqoon	White Agaric	Fungus grown on old pine trees in South and Central Europe	Europe
Alhagi pseudalhagi syn. *Alhagi camelorum*	Turanjbeen (Alhagi Manna)	Camel Thorn Persian Manna Plant	Mediterranean and Sahara to Central Asia and the Himalayas	Pakistan
Althaea officinalis	Khatmi	Marsh Mallow	Europe, from Denmark southwards	Iran
Anacyclus pyrethrum	Akarkaraa	Spanish Pellitory	Spain and other Mediterranean countries	Morocco
Aquilaria agallocha	Dhooplak-kar, Agar	Aloe-wood Eagle-wood	Malayan Peninsula, Assam, Manipur, Silhat, Bhutan	Malacca
Aristolochia longa	Zaraavand Taweel	Birthwort	Southern Europe	Kabul
Aristolochia rotunda	Zaraavand Madahraj	Birthwort	*A. Clematis* (Europe) *A. Longa* (North America) *A. Indica* (India)	Iran
Artemisia absinthium	Afsanteen	Worm wood	Europe, South America, North Africa, Siberia, Mangolia	Nepal
Artemisia maritima	Dirmaanaa Turki Kirmaalaa	Santonica Worm seed	North America, Brazil, Iran, Baluchistan, Pakistan, Kashmir, Nepal, Tibet	Iran
Asarun europaeum	Asaaroon Asarabacca	Wild Nard Hazelwort	Temperate Europe, North Asia (Birthwort family)	China
Asparagus officinalis	Halyun	Sperage, Sparrow Grass	Europe, Greece, Western Asia, Southern parts of Russia, Poland	Iran

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Asparagus racemosus	Sataawari	Asparagus var.	Upper Gangetic plains, Dehradun, Bihar plateau, Tropical and sub-tropical parts of India including the Himalayas and Andamans. A. adscendens: Western Himalayas, Himachal Pradesh, Kumaon, Chamba	Nepal
Astragalus sarcocola	Anzaroot (gum)	Sarcocola	Iran	Iran
Bambusa arundinacea	Banslochan (Manna) Tabaasheer	Thorny bamboo manna	South-East Asia	Indonesia
Berberis vulgaris	Zarishk	Barberry	Europe and the British Isles, naturalized in parts of North America	Afghanistan
Blepharis edulis	Utangan seeds		Sindh, Baluchistan	Pakistan
Borago officinalis	Gaozabaan		England, Europe, North Africa, North America	Iran, Baluchistan
Cardiospermum halicacabum	Habb-e-Qilqil	Baloon Vine	Tropical America extending to Africa and Asia	Iran
Carum carvi	Kaalaa jeeraa		Europe, North Africa, Asia	Iran
Centaurea behen	Behman Safed	White behen	Persia	Afghanistan
Salvia haemotodes	Behman Surkh	Red behen (sage)		
Colchicum autumnale	Suranjaan Talkh	Bitter colchicum Meadow saffron	Europe, part of British Isles, North Africa, Kashmir	Afghanistan
Cinnamomum zeylanicum	Daarchini	Cinnamon	Southeast Asia, China	China, Indonesia
Commiphora mukul	Guggulu (exudate)	Bdellium	Arid rocky tracts of Rajasthan, Khandesh, Berar, Mysore, Sindh, Baluchistan	Pakistan

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Commiphora myrrha	Bol, Hiraabol (exudate)	Myrrh	Arabia, Somaliland, North-East Africa	Dubai
Commiphora opobalsamum	Balsaan	Balsam tree, Gilead	In countries of both sides of Red Sea	Yemen
Convolvulus scammonia	Saqmonia	Scammony	Mediterranean region	England
Corylus avellana	Funduq	Hazel nut	Turkey, Italy, Spain, USA	England, Turkey
Cuscuta epithymum (Lesser Dodder) *C. europaea* (Greater or Common Dodder)	Aftimoon (Dried whole plant of *Cassytha* filiformis, also of *Cuscuta* reflexa are sold as Aftimoon)	Dodder or Cuscuta	A parasite in most parts of the world	Pakistan
Dorema ammoniacum	Ushaq	Gum Ammoniac	Iran, extending into southern Siberia	Iran
Doronicum pardalianches/ Doronicum hookeri	Darunaj aqrabi	Leopard's Bane (Also equated with *Arnica montana*)	Europe	Iran, Europe
Dracaena cinnabari	Damm-ul-Akhwain	Dragon's Blood	Saudi Arabia, East Africa	Yemen
Ephedra gerardiana/Ephedra vulgaris	Somlataa		West-Central China, Southern Siberia, Japan. Also Spain Baluchistan	Pakistan
Euphorbia resinifera	Farfiyun	Euphorbium	Morocco	Morocco
Ferula assafoetida	Hing	Assafoetida	Eastern Persia, Western Afghanistan	Afghanistan, Kazakhstan, Iran
Ferula galbaniflua	Jaosheer (gum-resin)	Opopanax tree Galbanum	Iran, Cape of Good Hope	Iran

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Ferula persica	Sakbeenaj	Sagapenum	Iran	Iran
Fraxinus ornus/F. routindifolia	Sheerkhisht (exudate)	Manna	Southern Europe, parts of Asia	Spain
Garcinia hanburyi	Usaar-e-Revand	Gambose, Gutta (extract)	Siam, Southern Cochin-China, Combodia, Sri Lanka	Thailand
Gentiana olivieri	Ghaafis Gul-e-Ghaafis	Persian Gentian	Iran	Afghanistan
Glycyrrhiza glabra	Asl-us-Soos	Liquorice	Spain, Germany, France, Italy, Russia	Iran, Afghanistan
Helicteres isora	Marorphali	East Indian Screw tree	Nepal, Bihar, Bengal, central, western and southern India, Andaman Islands	Nepal
Helleborus niger	Kharbaq Siyah	Black Hellebore	Central and southern Europe, Germany, Greece, Asia Minor	Germany
Hyoscyamus niger	Bazr-ul-Banj Khoraasaani Ajwaayin	Henbane seeds	Central and southern Europe, Western Asia, Siberia	Baluchistan, Afghanistan
Hyssopus officinalis	Zufaa	Hyssop	Southern Europe	Afghanistan
Illicium verum	Star Anise	Anise of China	China, South-East Asia	China
Ipomoea purga / Convolvulus jalapa	Jalaabaa, Jalaapaa	Jalap	Mexico	Mexico
Juniperus communis	Hauber, Abhal	Common Juniper	Europe, North Africa, North Asia, North America	Pakistan
Lallemantia royleana	Baalangu		Western Asia, Iran	Pakistan, Baluchistan
Laurus nobilis	Habb-ul-Ghaar	Bay Laurel, Roman Laurel	Shores of Mediterranean Southern Europe	Saudi Arabia
Lavandula stoechas	Ustuk-huddus	French Lavender	Mediterranean region	Morocco

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Lepidium sativum	Habb-ul-Rashaad, Haalim	Garden Cress	Iran	Iran
Lupinus albus	Turmus	White Lupin	North and South America, Southern Europe, Egypt	Iran
Marrubium vulgare	Faraasiyun	White Horehound	England, Europe, Baluchistan, Iran	Iran
Matthiola incana	Turdi Zard (Tudri Surkh is equated with *Cheiranthus cheiri*)	Gilli Flower Wall Flower Common Stock	Mediterranean region, Western Europe	Iran
Melia azedarach	Bakaayin	Persian Lilac	China, Baluchistan, Kashmir, Western Himalayas, South India	Afghanistan
Melissa officinalis	Baadran-jboyaa, Billilotan	Catmint Catnip Mountain Balm	Europe, North America, Iran	Iran
Merendera persica	Suranjaan Shireen	Sweet Hermodactyl	Iran	Iran
Myristica fragrans	Jaiphal	Nutmeg	Native to Malacca Islands and New Guinea, Sri Lanka, West Indies	Sri Lanka
Myrrhis odorata	Anjudaan Roomi	Sweet Cherirel	England	Iran
Myrtus communis	Habb-ul-Aas Muurad	Myrtle	Southern Europe	Afghanistan
Ocimum basilicum	Tukhmshar-bati (seeds)	Sweet Basil	France, Central Asia	Europe
Ocimum pilosum	Tukhm-e-Rehaan (seeds)	Wild Basil	Tropical and warm temperate regions	Pakistan, Iran
Olea europaea	Zaitoon	Olive	Mediterranean region	Europe

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Oligochaeta ramosa syn. *Volutarella ramosa V. divaricata Tricholepis procumbens Amberboa divaricata*	Baadaaward (Imported herb is actually Fagonia arabica)		Mediterranean region, Central Asia, India	Iran, Pakistan
Orchis latifolia/Orchis sp.	Saalab Misri (root) Saalab panjaa (root) Saalab gattaa (root)	Salep	Central and southern Europe	Iran, Pakistan
Origanum vulgare	Marzanjosh	Wild Morjoram	England, Europe, North Africa, Asia	Tibet, China
Paeonia officinalis	Ood saleeb	Peony root	Southern Europe, West Asia	Pakistan
Pastinaca secacul	Shaqaq-ul-Misri		Iran, Afghanistan, Egypt	Afghanistan
Peganum harmala	Harmal	Harmal, Syrian Rue, Wild Rue, Foreign Henna	Mediterranean region, mexico, Asia, Ladakh, Kashmir, Punjab	Pakistan, Iran
Peucedanum grande	Duku patti (seed)		Iran	Iran
Phoenix dactylifera	Gond Chhuhaaraa		North Africa, Egypt, Syria, Saudi Arabia	Iran, Pakistan
Pimpinella anisum	Anisoon	Anise	Originally from Egypt Minor. Now cultivated in warmer climates and Asia	China, Hong Kong, Taiwan, Malaysia, Vietnam
Pinus succinifera (now extinct)	Kahrubaa (fossil resin)	Amber	Baltic Amber or Malay Archipelago found in Scandinavia	Germany

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Piper cubeba	Kabaabchini Kankol	Cubeb	Java, Sumatra	Indonesia
Piper longum	Peepali	Long pepper	North-eastern, Southern India, Sri Lanka, Bengal	Indonesia
Pistacia integerrima Rhus succedanea	Kaakraa-singi (galls)	Crab's Claw	Mediterranean region to East Asia, Himalayan ranges on the North-west	Pakistan
Pistacia lentiscus	Mastagi, Roomi Mastagi	Mastich (resin)	Mediterranean region, Iran, Afghanistan, Kabul	Kabul, Greece
Pistacia vera	Gul-e-Pistaa (flower)		Syria, Iran, Afghanistan	Iran, Afghanistan
Polygonum bistorta	Anjabaar	Bistort, Odewort, Snake Weed	Southern Scotland, Western Asia, Japan	
Polypodium vulgare	Bisfaayej (root)		Europe, Turkey	Turkey, Nepal
Punica granatum	Gulnaar Faarsi		Iran, Saudi Arabia, Afghanistan, Baluchistan, India	Pakistan, Afghanistan
Quercus infectoria	Maazu (gall)	Gall Oak, Dyer's Oak, Aleppo or Turkey Galls (collected in Asiatic Turkey in the province of Aleppo) Mecca galls	Greece, Asia Minor, Iran, Syria. Mecca galls are from Bassorah	Iran, Turkey
Rheum emodi	Revandchini	Rhubarb	Kashmir to Sikkim, Assam. Chinese: *R. palmatum* and *R. officinale*. English: *R. rhaponticum (Rhapontic)*. Indian: *R. emodi* and *R. Webbianum*	Nepal
Rhus coriaria	Sumaaq	Sumach, Japan Wax tree	Mediterranean region, Spain, Italy, Sicily, Iran, Afghanistan, Saudi Arabia	

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Rubia tinctorum	Majeeth	Madder	Southern Europe and parts of Asia	Iran
Salvia plebeia	Samundar-sokh (seeds)	Sage Seeds	Temperate and tropical regions	Pakistan
Sisymbrium irio	Khoobka-laan, Khaaksi (seeds)	London Rocket	Northern India, Iran, Europe	Iran
Smilax aris-tolochiaefolia	Ushbaa Maghrabi	Mexican Sarsaparilla	Central America	Mexico
Smilax china	Chobchini		Eastern Asia, China, Japan	China
Strychnos ignatii	Papitaa Vilaayati	Ignatius Bean	Philippine Islands, Cochin-China	Phillipines
Styrax benzoin	Lobaan	Gum benjamine	Java, Sumatra, Malay, Malacca	Penang, Indonesia
Syzygium aromaticum	Qaranful, Laung	Clove	Cultivated in Tamil Nadu, Kerala, Sri Lanka, Indonesia, Malacca Islands, Tanzania, Madagascar, Penang, Brazil, other Tropical parts	Zanzibar
Tanacetum umbelliferum	Buzidaan Vilaayati	Sweet Pellitory	Iran	Iran
Teucrium chamaedrys	Usqurdiyun Ka-maazarius	Wall Germander	England, Europe	Europe
Thymus serpyllum	Haashaa	Wild Thyme	England, France, Europe	
Trifolium alexandrinum	Ispast	Clover, Trefoil berseem	England, Europe, Mediterranean region Central and Northern Asia	Seeds of Amaran-thus retro-flexus are imported from Iran
Trigonella un-cata/Melilotus officinalis	Naakhuunaa Ikil-ul-Malik	Meliot (bean) Tonkin bean	Iran, Afghanistan	Iran

BOTANICAL NAME	COMMON NAME	ENGLISH NAME	HABITAT	MAIN SOURCE
Urginea scilla	Isqeel	Squill	Mediterranean region, Spain, Protugal, Morocco, Corsica, Southern France, Malta, Algeria, Italy, Dalmatia, Greece, Syria, Asia Minor	Italy, Spain, Pakistan
Urtica pilulifera	Anjuraa	Roman Nettle	Europe	Europe
Valeriana hardwickii/V. jatamansi	Sugandha-baalaa Taggar Mushk-baalaa	Indian Valerian	Temperate Himalayas from Kashmir to Bhutan; Khasi and Jantia Hills. Valerian (*Valeriana officinalis*): Europe and Northern Asia	Nepal
Viola odorata	Banafshaa Gul-e-Banafshaa	Sweet Violet	Europe, Britain, Asia	Pakistan
Viscum album	Koli daakh, Mavizaj-e-Asli, Kishmish Kaabali	Mistletoe	Afghanistan, Europe	Afghanistan
Withania coagulans	Paneer Paneer Dodaa (fruit, seed)	Vegetable Rennet	Afghanistan, Baluchistan, Sindh, Punjab	Iran, Pakistan
Withania somnifera	Asgand	Winter Cherry	Israel, East of Mediterranean region, South Asia	Afghanistan
Zataria multiflora	Saatar faarsi	Savory	Saudi Arabia, Iran, Afghanistan, Baluchistan	Pakistan, Afghanistan
Zizyphus jujuba Mill *Z. sativa* Gaertin	Unnaab	Jujube	China, Far East, Middle East, Africa	Kabul

Standardized Extracts of Indian Herbs used in India

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Abies webbiana leaf	Expectorant	Powder/Paste, Alkaloids >0.5%
Abroma augusta root	Emmenagogue	Powder/Paste: Alkaloids 0.15%, Tannins 2.4%–4%
Abrus precatorius seed	Abortifacient	Powder: Glycosides 15%, Alkaloids 1%
Abutilon indicum seed	Diuretic, Nervine tonic	Powder: Mucilage 10%
Acacia arabica bark	Astringent	Powder: Tannins 40%
Acacia catechu gum	Astringent	Powder: Tannins 60%, Catechins 20%
Acacia concinna pods	Detergent	Powder/Paste: Saponins 10%–20%
Achillea millefolium seeds	Stimulant, Antispasmodic	Powder: Bitters 3%
Achyranthes aspera plant	Alterative, Diuretic	Powder/Paste: Saponins 3%
Aconitum heterophyllum plant	Antiperiodic, Antiemetic	Powder/Paste: Alkaloids 1%–1.5%
Aconitum sp. root	Antipyretic	Powder/Paste: Alkaloids 2%
Acorus calamus rhizome	Antispasmodic	Powder/Paste: Vol. Oil 1%
Adhatoda vasica leaf	Expectorant, Bronchodilatory	Powder/Paste: Alkaloids 0.5%–2.5%
Aegle marmelos leaf	Anti-diabetic	Powder: Tannins 7.5%
Aegle marmelos unripe fruit	Haemostatic, Anti-dysenteric	Powder/Paste: Tannins 5%, Mucilage 10%–15%
Albizia lebbeck bark	Anti-inflammatory	Powder/Paste: Tannins 15%
Allium cepa bulbs	Hypolipidemic, Hypocholesterolemic	Powder/Paste: Quercetin 5%
Allium sativum bulbs	Hypocholesterolemic Antirheumatic	Powder/Paste: Alliin 1.5%–2.5% by HPLC
Aloe vera leaf	Purgative	Powder/Paste/Gel/Gum: Aloin 1.5% (3:1), Polysaccharides 50% (200:1)
Alpinia galanga rhizome	In bronchial catarrh	Powder/Paste: Shagaol >4% by HPLC
Alstonia scholaris bark	Alterative, Astringent	Powder: Alkaloids 0.3%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Anacyclus pyrethrum flowers	Stimulant, Sialogogue	Powder: Alkaloids 0.5%
Andrographis paniculata plant	Hepatoprotectant, Antiviral	Powder/Paste: Andrographolides >10%
Anethum sowa seed	Carminative	Powder/Paste: Vol.Oil 3%
Aphanamixis rohituka bark	Astringent	Powder: Tannins 10%
Apium graveolens seed	Carminative	Powder/Paste: Vol. Oil 5%
Argyreia speciosa root	Alterative, Nervine tonic	Powder: Resin 4.5%
Asparagus adscendens root	Nervine Tonic, Galactogogue	Powder: Saponins >10%
Asparagus racemosus root	Galactogogue	Powder/Paste: Saponins >15%
Asteracantha longifolia herb	Antirheumatic	Powder/Paste: Alkaloids 0.35%
Atropa belladonna leaf	Antispasmodic, Sedative	Powder/Paste: Alkaloids 0.95%–1.6%
Atropa belladonna root	Antispasmodic, Sedative	Powder/Paste: Alkaloids 3%
Azadirachta indica bark	Astringent	Powder: Bitters 1%
Azadirachta indica leaf	Blood purifier	Powder/Paste: Bitters 2.5%
Bacopa monnieri herb	Brain Tonic	Powder/Paste: Bacosides 15%–50%, Alkaloids 5%
Barleria prionitis herb	Lymphadenitis, Toothache	Powder: Tannins 5%, Alkaloids 0.5%
Bauhinia variegata bark	Alterative, antileprotic	Powder, Tannins 25%
Berberis aristata root	Emmenagogue, Cholagogue	Powder/Paste: Berberine >8%
Bergenia ligulata root	Antiurolithiatic	Powder/Paste: Tannins 10%
Boerhavia diffusa root	Diuretic, Hepatoprotective	Powder/Paste: Alkaloids 0.01%–0.08%
Boswellia serrata gum	Antiarthritic	Powder/Paste: Boswellic acids >50%
Butea frondosa flowers	Astringent	Powder/Paste: Glycosides >8%
Caesalpinia bonducella nut	Antipyretic	Powder/Paste: Bonducin 2.5%
Calotropis gigantea root	Emetic, Antiperiodic	Powder/Paste: Alkaloids 0.3%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Camellia sinensis	Antioxidant	Powder/Paste: Polyphenols >45% by HPLC
Capparis spinosa root	Analgesic, Antirheumatic	Powder: Glycosides 15%
Capsicum sp. fruit	Antirheumatic	Powder/Paste: Capsaicin >3%
Cassia angustifolia leaf	Laxative	Powder: Sennosides 15%
Cassia angustifolia pods	Laxative	Paste: Sennosides 2.5%
Cassia fistula fruit	Laxative	Powder/Paste: Oxymethyl-anthraquinones >1%
Cassia occidentalis fruit	Purgative	Powder/Paste: Oxymethyl-anthraquinones 1.2%
Cedrus deodara wood	Antirheumatic	Powder/Paste: Vol. Oil 1%
Celastrus paniculatus seed	Antirheumatic, Tranquilizer	Powder/Paste: Alkaloids 0.1%
Centella asiatica	Leprostatic, Memory tonic, Sedative	Powder/Paste: Asiaticosides >10%, Asiatic acid 2%
Cephaelis ipecacuanha root	Emetic	Powder/Paste: Alkaloids 1%
Cephalandra indica leaf	Antidiabetic	Powder: Resin 2.5%
Cicer arietinum seeds	Nutritive	Powder: Protein 15%
Cichorium intybus seeds	Liver and spleen tonic	Powder/Paste: Bitters >1%
Cinchona ledgeriana bark	Antimalarial	Powder/Paste: Alkaloids 4%
Cissus quadrangularis stem	Bone healing	Powder: Ketosterones >5%
Citrullus colocynthis fruit	Purgative	Powder: Bitters 4.5%
Citrullus colocynthis root	Purgative, Antirheumatic	Powder, Bitters 5%
Citrus aurantium peel	Antioxidant	Powder/Paste: Flavones >4%, Vol. Oil 1%
Citrus medica peel	Antiscurvy	Powder: Acidity as citric acid 2%, Flavones 5%
Colchicum luteum corms	In uric acid diathesis	Powder: Alkaloids >0.5%
Coleus forskohlii root	cAMP stimulator, Hypotensive	Powder: Forskolin >2.5%, 10% & 20% by HPLC
Commiphora mukul gum	Antarthritic, Antilipemic, Anticholesterolemic	Powder/paste: Guggul sterones 2.5% to 10% by HPLC

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Commiphora myrrha gum	Mouthwash, Astringent	Powder: Vol. Oil 5%
Coriandrum sativum seeds	Carminative	Powder/Paste: Vol. Oil 1%
Crataeva nurvala bark	Lithotriptic	Powder: Saponin >2.5%
Cucumis sativus seeds	Diuretic	Powder: Mucilage 24%
Cuminum cyminum fruit	Carminative, Stimulant	Powder/Paste: Vol. Oil 1%
Curcuma amada rhizome	Carminative, Hypolipidaemic	Powder/Paste: Vol.Oil 10%
Curcuma longa rhizome	Anti-inflammatory, Stomachic	Powder/Paste: Voil. Oil >10%, Curcumin >10%
Curculigo orchioides root	Uresis, Skin diseases	Powder: Saponins 20%, Mucilage 30%
Cynodon dactylon herb	Astringent	Powder: Tannins 5% Alkaloids +ive
Cyperus scariosus root	Intestinal antiseptic, Anti-inflammatory	Powder/Paste: Alkaloids 0.15%–0.5%
DGL Deglycyrrhizinated Liquorice	Antiulcer, Antacid	Powder: Flavones 1%, Glycyrrhizin<3%
Dashmool (The Ten Roots)	Antirheumatic	Powder/Paste: Tannis 2%
Datura stramonium leaf	Antispasmodic, Expectorant	Powder/Paste: Alkaloids 0.5%–0.7%
Daucus carota seed	Abortifacient	Powder/Paste: Alkaloids 0.4%, Flavones 5%
Dolichos biflorus seeds	Diuretic	Powder: Saponins 20%
Eclipta alba plant	Antihepatotoxic	Powder/Paste: Nor-wedelolactone >3%
Embelia ribes seed	Anthelmintic	Powder/Paste: Tannins 1%, Embelin 1%
Emblica officinalis fruit	Antioxidant, Source of Vitamin C, Antacid, Astringent	Powder/Paste: Tannins >20%, Ellagic acid >5%
Enicostemma littorale herb	Bitter tonic, Laxative	Powder/Paste: Bitters 4%
Ephedra vulgaris herb	Stimulant	Powder/Paste: Alkaloids 0.2%–0.5%
Eugenia jambolana seed	Antidiabetic	Powder: Saponins 4%, Alkaloids 0.4%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Euphorbia hirta herb	Antispasmodic	Powder/Paste: Flavones >6%
Evolvulus alsinoides plant	Memory tonic	Powder/Paste: Bitters >2.5%
Ferula foetida resin	Carminative, Stimulant	Powder: Vol.Oil 1.5%
Ficus racemosa leaf	Astringent	Powder: Tannins 5%
Ficus racemosa bark	Astringent	Powder: Tannins 10%
Foeniculum vulgare fruit	Carminative, Spasmolytic	Powder/Paste: Vol. Oil >1%
Fumaria Officinalis herb	Diaphoretic	Powder/Paste: Bitters >1%
Garcinia cambogia rind	In obesity	Powder/Liquid: HCA 50% by HPLC
Glycyrrhzia glabra root	Expectorant, Anti-inflammatory	Powder/Paste: Glycyrrhizin by Garratt method >15%/24%
Gossypium herbaceum root	Emmenagogue, Galactagogue	Powder: Alkaloids 0.4%, Flavones 1.5%
Gymnema slyvestre leaf	Antidiabetic	Powder: Gymnemic acids 25%–75%
Hemidesmus indicus root	Alterative, antiseptic	Powder/Paste: Saponins 7.5%
Holarrhena antidysenterica seed	Antidysenteric	Powder: Alkaloids 3%
Holarrhena antidysenterica bark	Antidysenteric, Anthelmintic	Powder/Paste: Alkaloids >4%
Hydrastis Indian root	Emmenagogue	Powder/Paste: Hydrastin 1%
Hyoscyamus niger herb	Antispasmodic, Sedative	Powder/Paste: Alkaloids 0.28%–0.3%
Hypericum perforatum herb	Antidepressant	Powder: Hypericin 0.3%
Indigofera tinctoria plant	Antiseptic, Astringent	Powder: Saponins 10%
Inula racemosa root	Antirheumatic, In chronic bronchitis	Powder/Paste: Alantolactone 2.5% by HPLC
Juglans regia bark	Astringent, Antiseptic	Powder: Tannins 12%
Lawsonia alba leaf	Antimicrobial, Anti-inflammatory	Powder/Paste: Tannins >5%
Leptadenia reticulata herb	Spermatogenic, Galactagogue	Powder/Paste: Alkaloids 0.5%
Lobelia nicotianaefolia leaf	Antispasmodic	Powder/Paste: Alkaloids 0.5%
Mangifera indica bark	Astringent	Powder: Tannins 20%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Matricaria chamomilla flower	Antiseptic	Paste: Vol. Oil 1%
Mentha spicata	Carminative, Stimulant, Spasmolytic	Powder/Paste: Flavones >2%
*Mesua ferrea*fruit & flower bud	Astringent, Styptic	Powder/Paste: Bitters >2.5%
Mimusops elegni bark	Astringent	Powder: Tannins 10%
Momordica charantia fruit	Antidiabetic	Powder: Bitters >2.5%
Morinda citrifolia fruit	Stimulant	Powder/Liquid: Morindin 15%, Scopoletin 0.17%
Moringa oleifera bark	Emmenagogue	Powder: Glycosides >5%
Moringa oleifera leaf	Anti-inflammatory	Powder/Paste: Alkaloids 0.1%
Mucuna pruriens seeds	Antiparkinsonian, Aphrodisiac	Powder: L-Dopa by IP method >15%
Myrica nagi bark	Astringent, Carminative	Powder: Tannins 5%
Myristica fragrans fruit	Hypocholesterolemic, Carminative	Powder/Paste: Vol. Oil 4%
Nardostachys jatamansi root	Sedative	Powder/Paste: Vol. Oil 0.1%–0.5%
Nelumbo nucifera seed	Stimulant	Powder: Saponins 30%
Nigella sativa seed	Anthelmintic, Carminative	Powder/Paste: Bitters 3%, Saponins 15%
Nyctanthes arbortristis leaf	Antirheumatic, Anthelmintic	Powder, Alkaloids 0.15%
Ocimum basilicum leaf	Carminative, Vermifuge	Powder/Paste: Tannins 5% Vol. Oil 1.5%
Ocimum sanctum herb/leaf	Immunomodulator, Expectorant	Powder/Paste: Tannins >7%, Ursolic acid >2%
Oldenlandia corymbosa plant	Heptoprotective, Febrifuge	Powder/Paste: Alkaloids 0.35%
Onosma echioides root	Anticutaneous	Powder/Paste: Alkamine 1%
Operculina turpethum root	Purgative	Powder: Resin >10%
Opuntia dillenii herb	Antispasmodic	Powder: Tannins 10%
Orchis mascula tubers	Nervine tonic	Powder: Saponins 4%, Mucilage 20%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Phyllanthus niruri herb	Antihepatotoxic, Antiviral	Powder/Paste: Bitters 1.4%–2%
Picrorhiza kurroa root	Antihepatotoxic, Bitter tonic	Powder/Paste: Kutkin 4%–6%, Bitters >6%
Piper cubeba fruit	Carminative, Expectorant	Paste, Vol. Oil 8%, Piperine 10%
Piper longum fruit	Carminative, Bioavailability enhancer	Powder/Paste Vol. Oil 10%, Piperine 5%
Piper nigrum fruit	Carminative, Bioavailability enhancer	Vol. Oil 7%, Piperine >10%
Pistacia integerrima galls	In bronchitis	Powder/Paste: Tannins 20%
Plumbago indica root	Anticutaneous	Powder: Alkaloids 0.08–0.15%
Podophyllum emodi rhizome	Purgative	Powder: Resin >20%
Polygala chinensis root	Anticatarrhl	Powder/Paste: Saponins 5%
Pongamia glabra seed	Anticutaneous	Powder/Paste: Fixed Oil 10%
Prunus serotina bark	Astringent	Paste: Tannins 10%
Psoralea corylifolia seed	Antipsoriatic	Powder/Paste: Psoralen >5%
Pterocarpus marsupium wood	Antidiabetic	Powder: Alkaloids 0.4%, Pterostilbene 4%–5%, Flavones 5%
Pterocarpus santalinus bark	Astringent, Antidiarrheal	Powder/Paste: Santalin >3%
Pueraria tuberosa root	Demulcent, Nervine tonic	Powder/Paste: Flavones 6%
Punica granatum rind	Astringent	Powder: Ellagic acid by HPLC >8%, Tannins 10–20%
Putranjiva roxburghii berries	Antiviral	Powder: Alkaloids 0.5%
Pyrus malus fruit	Nutritive. Natural source of Iron	Powder/Paste: Iron 4%
Quercus infectoria galls	Astringent	Powder/Paste: Tannins 40%
Randia dumetorum fruit	Antioxidant, heptaprotectine	Powder/Paste: Oleonolic acid >5%
Rauvolfia serpentina root	Hypotensive	Powder/Paste: Alkaloids >8%
Rheum emodi root	Blood purifier, Liver protectant, Laxative	Powder/Paste: Oxymethyl anthraquinones >5%
Ricinus communis leaf	Antiheptatoloxic, Anti-inflammatory	Powder: Alkaloids 2.5%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Ricinus communis root	Laxative	Powder: Alkaloids 0.5%
Rubia cordifolia root	Anticutaneous	Powder/Paste: Tannins >2%
Salacia reticulata root	Anticutaneous, Antirheumatic	Powder: Glycosides >15%, Flavones >5%
Santalum album wood	Coolant, Antibacterial	Powder/Paste: Vol. Oil 2%
Saraca indica bark	Uterine tonic	Powder/Paste: Tannins >2.5%
Saussurea lappa root	Antispasmodic, Carminative	Powder/Paste: Alkaloids >0.2%
Sida cordifolia root	Nervine Tonic	Powder/Paste: Alkaloids >0.1%
Silybum marianum seeds	Hepatoprotectant, Diuretic.	Powder: Flavones >50%, Silymarin 50%
Solanum nigrum berries	Expectorant, Liver tonic	Powder/Paste: Alkaloids 0.2%, Bitters >1%
Solanum xanthocarpum plant	Antiasthmatic, Expectorant	Powder/Paste: Solasodin >1%
Strychnos nux vomica seeds	CNS stimulant, Analeptic	Powder/Paste: Alkaloids 3%–6%
Swertia chirayita plant	Blood purifier	Powder: Bitters 4%
Symplocos racemosa bark	Uterine tonic	Powder/Paste: Alkaloids 0.5%
Taraxacum officinale herb	Hepatic stimulant	Powder/Paste: Bitters 2.5%, Alkaloids 0.5%
Tecomella undulata bark	Astringent	Powder: Tannins 10%
Tephrosia purpurea plant	Antioxidant, Antihepatotoxic	Powder/Paste: Rutin 2%–6% by HPLC
Terminalia arjuna bark	Cardio vascular support, Antiarrhythemic	Powder/Paste: Tannins >25%, Arjunic acid >1%
Terminalia bellirica fruit	Detoxificant , Spasmolytic	Powder: Tannins >10%
Terminalia chebula fruit	Detoxificant, Purgative	Powder: Tannins 20%–40%
Tinospora cordifolia root	Hepatoprotective	Powder/Paste: Bitters >1.5%
Trachyspermum ammi fruit	Carminative	Powder/Paste: Vol. Oil 10%
Tribulus terrestris fruit	Spermatogenic, Diuretic, Nephroprotective	Powder/paste: Saponins 15%–45%
Trichosanthes dioica leaf	Antidiabetic	Powder: Saponins 10%
Trigonella foenum-graecum seed	Antilipemic, Anticholesterolemic	Powder: Saponins 15%–40%

Botanical name/ Part used	Common use/Activity	Form, Chemical marker(s)
Trikatu: Dry ginger, Long pepper and Black pepper	Increases bioavailability of drugs	Powder/Paste: Vol. Oil >1%, Piperine >2%
Triphalaa The Three Myrobalans	Detoxificant	Powder: Tannins >25%
Triticum sativum bran	Nutritive	Powder: Vit B1= 40 mcg/g B2= 6.28 mcg/g B5= 1130 mcg/g
Triticum sativum germ	Anticutaneous	Oil, Vit. E 0.8% by HPLC
Tylophora indica leaf	Antiasthmatic	Powder/Paste: Alkaloids >0.1%
Urginea indica bulbs	Cardiac stimulant, Diuretic	Paste: Glycosides 10%
Valeriana wallichii root	Sedative	Powder/Paste: Valeric acid 0.8%
Viburnum sp. bark	Emmenagogue	Powder/Paste: Tannins >1.4%
*Viola odorata*flowers/leaf	Expectorant, Antiseptic	Powder/Paste: Saponins 2.5%
Vitex negundo leaf	Anti-inflammatory	Powder/Paste: Alkaloids 0.15%
Vitis vinifera fruit/seed	Antioxidant	Powder/paste: Polyphenols >20% by HPLC
Wedelia calendulacea herb	Hepatoprotective	Powder/Paste: Tannins 5%, Saponins 2%
Withania somnifera root	Immunomodulator, Antioxidant	Powder/Paste: Withanolides >2.5%
Woodfordia floribunda flowers	Antileucorrhoeic	Powder/Paste: Tannins 7%
Zingiber officinale rhizome	Anti-inflammatory, Carminative, Antinauseant	Powder/Paste: Gingerols by HPLC >5%

(continued)

Herbal extracts for Cosmetic/Topical Application

Botanical name/ Part used	Common name	Form	Use
Acacia concinna pods	Shikaakaai	Powder	Shampoos, soaps
Acorus calamus rhizome	Sweet flag	Powder/Paste	Aromatic, dusting powders, skin lotions
Allium sativum bulbs	Garlic	Powder/Paste	Skin healing products
Aloe vera leaf	Aloe	Powder/Paste	Radioprotective, moisturizer, sunscreen
Alpinia galanga rhizome	Galanga	Powder/Paste	Aromatic, in dusting powders
Avena sativa fruit	Oat	Powder/Paste	Skin tonic/moisturizer
Azadirachta indica leaves	Neem	Powder/Paste	Toothpastes, soaps, shampoos
Balsamodendron myrrha gum	Myrrh	Powder/Paste	Soaps/shampoos
Calendula officinalis flowers	Marigold	Paste	Skin care products
Cedrus deodara wood	Deodaar	Powder/Paste	Shampoos/soaps
Centella asiatica plant	Gotu kola	Powder/Paste	Wound-healing
Cichorium intybus seed	Chicory	Powder/Paste	For sore eyes/skin of blemishes
Citrus aurantium peel	Orange	Paste	Skin creams, soaps, shampoos
Citrus limon peel	Lemon	Powder	Skin and hair loss products
Coriandrum sativum seed	Coriander	Powder	Anti-inflammatory
Crocus sativus stigma	Saffron	Liquid	Postbath massage
Curcuma longa rhizome	Turmeric	Powder/Paste	Antibacterial, skin creams and lotions
Curcuma zedoaria rhizome	Zedoary	Powder/Paste	Antibacterial, aromatic
Daucus carota seeds	Carrot	Oil	Natural source of Vit. A
Eclipta alba plant	Bhringaraaj	Powder/Paste	Shampoos
Glycyrrhiza glabra root	Liquorice	Powder/Paste	Anti-inflammatory
Hedychium spicatum rhizome	Kapurkachri	Oil	Hair oils
Hibiscus rosa sinensis flowers	China rose	Paste	Shampoos

Botanical name/ Part used	Common name	Form	Use
Iris florentina root	Orris	Powder	Additive to dusting powders
Lawsonia alba leaves	Henna	Powder/Paste	Shampoos
Matricaria chamomilla flowers	Chamomile	Powder/Paste	Hair tonic/analgesic
Moringa oleifera seed	Benjamin	Oil	Hair oils, suntan lotion
Prunus serotina bark	Wild cherry bark	Powder	Shampoos
Pterocarpus santalinus bark	Red sandalwood	Powder/Paste	Skin creams
Rubia cordifolia root	Manjisthaa	Powder/Paste	Wound-healing
Santalum album	Sandal wood	Powder/Paste	Skin lotions
Triticum sativum germ	Wheat germ	Oil	Skin lotions, natural source of Vit E

Source: *Vikram Naharwar, Director, Amsar Pvt. Ltd. Indore-452006. INDIA.*

Internet Resources of Herbal Medicine

AGRICOLA (Agricultural Online Access):
http://www.nal.usda.gov/general_info/agricola/agricola.html

Alternative Herbal Index:
http://onhealth.webmed.com/alternative/resource/herbs/index.asp

Alternative Medicine Connection: www.arxc.com

Alternative Medicine Home Page, from the University of Pittsburg:
http://www.pitt.edu/-cbw/altm.html
For WHO Herbal Monographs under "Development", see entry for Alternative Medicine Home Page from the University of Pittsburg.

Alternative Medicine, University of Texas:
http://www.sph.uth.tmc.edu/utcam/therapy/htm

American Botanical Council: http://www.herbalgram.org

American Herbal Pharmacopoeia: http://www.herbal-aph.org

American Herbalists Guild: http://www.americanherbalistsguild.com

Andrew Weil's Website: www.drweil.com

Ayurvedic medicines: www.dabur.com www.thehimalayadrugco.com

British Herbal Medicine Association: http://www.ex.ac.uk/phytonet/bhma.html

Chinese Medicine: http://www.cintcm.com/index.htm

Congress on Alternative and Complimentary Therapies:
www.alternativemed.com

European Scientific Cooperative on Phytotherapy (*ESCOP*):
http://www.escop.com

Facts and Comparisons, The Review of Natural Products:
www.factsandcomparisons.com

Herbs, Chemistry:
http://friedle.com (flavonoids)
http://realtime.net/anr (Austin Nutritional Research)
http://www.aspp.org (Biochemistry and Molecular Biology of plants)

HerbMed: http://www.herbmed.org

Herbal Past and Present Database:
http://www.extra.hu/hbock/dbase/index.html

Herb Research Foundation (*HRF*): http://www.herbs.org

Links to Medline:
www.herbmed.org
http://www.nlm.nih.gov/medlineplus/herbalmedicine.html
http://www.seanet.com/?vettf/Medline4.htm

The Longwood Herbal Task Force: www.mep.edu/herbal

Medical Herbalism Online: www.medherb.com

Mother Nature Health Encyclopedia:
www.mothernature.com/ency/herb/lingustrum.asp

National Centre for Complimentary and Alternative Medicine (*NCCAM*):
http://nccam.nih.gov

National Library of Medicine: www.nlmgateway.com

Natural Medicines Comprehensive Database: www.naturaldatabase.com

The Natural Pharmacist (*TNP*):
http://www.memorialhospitaljax.com/healthcontent.asp?page=/choice/demonstration

New York Academy of Sciences: www.nyas.org www.scientificamerican.com

New York Academy of Sciences: www.nyas.org

Phyto Net: http://www.escop.com/phytonet.htm

Thorne Research Alternative Medicine Review:
www.thorne.com/altmedrev/index.html

United States Pharmacopoeia (*USP*): http://www.usp.org

World Health Organization (*WHO*):
http://who.int/medicines/library/trm/medicinalplants/monographs.shtml

Bibliography

The Ayurvedic Formulary of India, Part I, second revised edn., Ministry of Health, Govt. of India. 2003.

The Ayurvedic Pharmacopoeia of India, Part I., Vol I to IV (2004), (*API*), Ministry of Health, Govt. of India, New Delhi.

Bartram's *Encyclopedia of Herbal Medicine*, Marlowe & Company, New York. 1998.

The British Herbal Compendium, British Herbal Medicine Association.

The British Herbal Pharmacopoeia, British Herbal Medicine Association.

Compendium of Indian Medicinal Plants, Ram P. Rastogi and BN Mehrotra, Vol. 5, Central Drug Research Institute, Lucknow. 1998. Published by *NISCAIR*, *CSIR*, New Delhi.

The Complete German Commission E Monographs, American Botanical Council, Austin, 1998.

Dictionary of Indian Medicinal Plants, Akhtar Husain et al., Central Institute of Medicinal and Aromatic Plants, Lucknow. 1992.

Dravyaguna Vigyaana, Vol. II (Hindi), PV Sharma, Chaukhambha Bharati Academi, Varanasi. 1991 edn.

ESCOP (European Scientific Cooperative on Phytotherapy), *The Scientific Foundation for Herbal Medicinal Products*, completely revised and expanded, second edn., Georg Thieme Verlag, Germany. 2003.

Formulary of Siddha Medicines, The Indian Medical Practitioners' Cooperative Pharmacy and Stores Ltd., (*IMPCOPS*), Chennai. 1989.

Healing Power of Herbs, Michel T. Murray, Revised second edn., Prima Health, Rocklin, CA. 1995.

Herbal Prescriptions for Better Health, Donald J. Brown, Prima Health, 1996.

Herbal Medicine–Expanded Commission E Monographs, American Botanical Council, Austin. 2000.

Herb-Drug Interaction Handbook, Sharon M. Herr, Church Street Books, Nassau, NY-12123-0527. 2002.

Indian Herbal Pharmacopoeia, Vol. I and II, Regional Research Laboratory, Jammu and Indian Drug Manufacturers' Assn., Mumbai. 1998.

Medicinal & Aromatic Plant Abstracts (Journal), *NISCAIR*, New Delhi. 1990 to 2005 issues.

Medicinal Plants used in Ayurveda, Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda), New Delhi. 1998.

A Modern Herbal, M. Grieve, Tiger Books International, London. 1994 edn.

National Formulary of Unani Medicine, Part I, First edn., Ministry of Health, Govt. of India. 1981.

Natural Medicines Comprehensive Database, 2007, Therapeutic Research Faculty, Stockton, CA-95208. www.naturaldatabase.com

PDR for Herbal Medicines. Medical Economics Company, Montvale, New Jersey. 1999. Thomson, third edn, 2005.

Phytochemical Investigations of Certain Medicinal Plants used in Ayurveda, Central Council for Research in Ayurveda and Siddha (*CCRAS*), New Delhi. 1990.

Phytotherapy, Capasso et al., Springer-Verlag, Heidelberg. 2003.

Plants of Bhava Prakash, Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda), New Delhi. 1999.

Plants of Sharangadhara Samhita, Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda), New Delhi. 1999.

Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised edn., Saffron Walden, Essex. 1998.

Principles and Practice of Phytotherapy, Simon Mills and Kerry Bone, Churchill Livingstone. 2002.

Rational Phytotherapy, V. Schulz, R. Hänsel, M. Blumenthal, V.E. Tyler (eds), Springer-Verlag, Berlin Heidelberg New York. 2004.

The Review of Natural Products by Facts and Comparisons, Wolters Kluwer, 4th edn. 2005.

Second Supplement to *Glossary of Indian Medicinal Plants* with Active Principles (A-K), LV Asolkar et al., *NISCAIR*, New Delhi.

Standard Nomenclature of Ayurvedic Medicinal Plants, Central Council for Research in Ayurveda and Siddha (*CCRAS*), New Delhi. 1999.

The Treatise on Indian Medicinal Plants, Asima Chatterjee and Satyesh Chandra Pakrashi, Vol. I to VI, *NISCAIR*, 2003.

The Toxicology of Botanical Medicines, Francis Brinker, third edn., Electic Medical Publications,Sandy, Oregon. 2000.

Unani Dravyagunaadarsha, Vol. II ((Hindi), Daljit Singh, Ayurvedic and Tibbi Academy, Uttar Pradesh, Lucknow. 1974.

The Wealth of India, Vol. II to XI, original series, *NISCAIR*, New Delhi.

The Wealth of India, Revised edns., Vol. 1 to 3 (Ci), *NISCAIR*, New Delhi.

The Wealth of India, First Supplement series, Vol, 2, 3. (2001), Vol. III (2002), Vol. IV (2003), Vol. V (2005). *NISCAIR* (National Institute of Science Communication and Information Resources, *CSIR*) New Delhi.

WHO Monographs on Selected Medicinal Plants, Vol. 1, 2, Vol. 3 (Website).

Source of dosage: Dosage consensus of the crude drug is based on the recommendations of *The Ayurvedic Pharmacopoeia of India*, Vol. I, II, III and IV, and *Central Council for Research in Ayurveda and Siddha*, Ministry of Health and Family Welfare, Govt. of India, New Delhi (as cited in *Standard Nomenclature of Ayurvedic Medicinal Plants*).

About the Author
C.P. Khare



C. P. Khare was born on December 18, 1932, and has been a herbalist for more than fifty years.

He was born into a family of herbal physicians. He studied the original Ayurvedic texts and acquired first-hand knowledge of the cultivation and processing of herbs and their usage even before going to college.

In 1952, he took up journalism. Since then he has edited and contributed many features on health and personal problems to various journals. He has been Director of India's largest magazine publishing group for the last twenty-five years–publishing twenty six magazines in nine languages (English, Hindi, Gujarati, Marathi, Bengali, Kannada, Tamil, Telugu and Malayalam), commanding a total circulation of more than 4 million.

As founder President and Director of the Society for New Age Herbals, which started functioning in 1990 in Delhi, he sought the cooperation and participation of physicians of modern as well as traditional medicine, pharmacologists and scientists to modify, restructure and reassess and age-old herbal formulations in the light of pharmacological research and clinical trails being undertaken in various research institutes of India.

He has also been included among the directors of Dabur Ayurvedic Specialities Ltd., a herbal major in India.

This reference work is the outcome of ten years of in-depth study and literary research of more than 2000 plant sources of Ayurvedic, Unani and Siddha systems of Indian medicine.

By the same author: East and West integrative 400 detailed monographs on Indian medicinal plants—in contemporary setup: *Encyclopedia of Indian Medicinal Plants/Indian Herbal Remedies.* Published by Springer.

Index

Botanical Names

B

C

E

M

P

Q

R

U

V

W

X

Spellings of botanical names based on “The Wealth of India” series, CSIR, New Delhi, India.

Crude Herb Identification Guide



Abies webbiana leaf (Dabur)



Abrus precatorious seed (Himalaya)



Abutilon indicum root (PLIM)



Acacia catechu dried wood (Dabur)



Acacia concinna dried pods (Dabur)



Aconitum ferox dried rhizome (Dabur)



Aconitum heterophyllum dried rhizome (Dabur)



Acorus calamus dried rhizome (Himalaya)



Adhatoda vasica dried leaf (Hamdard)



Aegle marmelos dried pulp (Himalaya)



Albizia lebbeck bark (Himalaya)



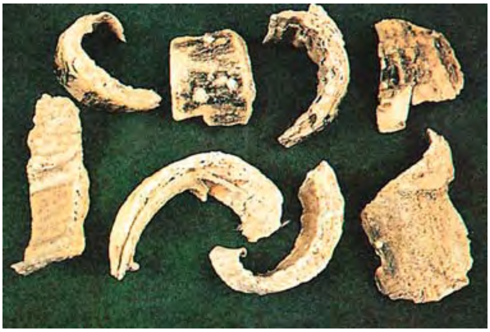
Aloe barbadensis dried herb (Himalaya)



Alpinia galanga rhizome (Himalaya)



Alpinia khulanjan rhizome (Hamdard)



Alstonia scholaris stem bark (PLIM)



Althaea officinalis seed (Hamdard)



Althaea officinalis flower (Hamdard)



Amomum subulatum fruit (Himalaya)



Anacyclus pyrethrum root (Dabur)



Ananas comosus dried flesh (Himalaya)


Anethum sowa seeds (Himalaya)


Apium graveolens fruit (PLIM)


Aquilaria agallocha dried wood (Dabur)


Areca catechu red/common nut (Hamdard/PLIM)


Argyreia nervosa plant part (CCRAS)


Aristolochia indica root (Hamdard)


Asparagus racemosus roots (CCRAS)


Asteracantha longifolia seed (Himalaya)



Azadirachta indica dried leaf (Himalaya)



Bacopa monnieri leaf



Baliospermum montanum root (PLIM)



Barringtonia acutangula seed (Dabur)



Bauhinia variegata stem bark (PLIM)



Berberis aristata stem bark (Dabur)



Bergenia ligulata rhizome (PLIM)



Betula utilis outer bark (Himalaya)



Boerhavia diffusa dried herb (PLIM)



Borago officinalis flower (Hamdard)



Boswellia serrata gum (PLIM)



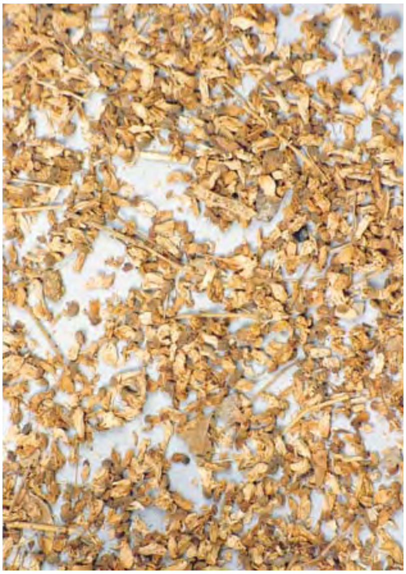
Butea monosperma flower (Himalaya)



Butea monosperma gum (Hamdard)



Caesalpinia bonducella seed (Himalaya)



Callicarpa macrophylla
dried flower (Dabur)



Calotropis procera plant parts (CCRAS)



Capparis spinosa stem (Himalaya)



Capsicum annuum fruit (WOI)



Carica papaya dried pulp (Himalaya)



Carthamus tinctorius seed (Hamdard)


Carum carvi fruit (PLIM)


Cassia absus seed (Hamdard)


Cassia angustifolia leaf (Hamdard)


Cedrus deodara wood (Himalaya)


Celastrus paniculatus seeds (Dabur)


Centaurea behen root (Hamdard)



Centella asiatica leaf



Chlorophytum arundinaceum root (Himalaya)



Cicer arietinum fruit (Himalaya)



Cinnamomum tamala leaf (PLIM)



Cinnamomum tamala bark (Hamdard)



Cinnamomum zeylanicum stem bark (Himalaya)



Cissampelos pareira root (PLIM)



Clitoria ternatea plant parts (CCRAS)



Colchicum luteum sweet/bitter corms (Hamdard)



Coleus forskohlii dried herb (Dabur)



Commiphora molmol gum



Commiphora wightii gum (PLIM)



Coptis teeta rhizome (Hamdard)



Coriandrum sativum fruit (Himalaya)



Crataeva nurvala bark (Himalaya)



Crotalaria juncea seed (WHO/PLIM)



Croton tiglium seed (WHO/PLIM)



Cucumis sativus cut fruits (Himalaya)



Curculigo orchioides cut rhizome (Dabur)



Curcuma zedoaria rhizome (Dabur)



Cyperus rotundus rhizome (Dabur)



Datura metel plant parts (CCRAS)



Daucus carota dried root (Himalaya)



Decalepis hamiltonii root (CCRUM)



Delphinium denudatum root (Hamdard)



Didymocarpus pedicellata
dried herb (Himalaya)



Dioscorea bulbifera tuber sections (Dabur)



Dolichos biflorus seed (WHO/PLIM)



Dracaena cinnabari resin (WHO/PLIM)



Elaeocarpus ganitrus fruit (Himalaya)



Elettaria cardamomum fruit (WHO/PLIM)



Embelia ribes fruit (Dabur)



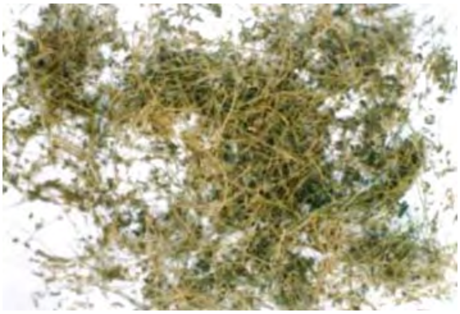
Emblica officinalis dried fruit (Dabur)



Eucalyptus globulus dried leaf (Himalaya)



Euphorbia neriifolia stem (WHO/PLIM)



Evolvulus alsinoides aerial parts (Himalaya)



Ficus benghalensis bark (WHO/PLIM)



Ficus carica dried fruit (Himalaya)



Ficus lacor bark (WHO/PLIM)



Ficus recemosa plant parts (CCRAS)



Ficus religiosa plant parts (CCRAS)



Foeniculum vulgare fruit (WHO/PLIM)



Fumaria officinalis dried herb (Himalaya)



Glycyrrhiza glabra stem (CCRAS)



Gossypium herbaceum seed (WHO/PLIM)



Gymnema sylvestre dried herb (Dabur)



Hedychium spicatum rhizome (WHO/PLIM)



Helicteres isora fruit (Hamdard)



Hemidesmus indicus root (WHO/PLIM)



Hibiscus rosa-sinensis dried herb (Himalaya)



Hiptage benghalensis plant parts (CCRAS)



Holarrhena antidysenterica bark (Himalaya)



Holarrhena antidysenterica seed (Dabur)



Hyoscyamus niger fruit (Himalaya)



Inula racemosa root (Dabur)



Ipomoea digitata dried herb (Himalaya)



Jasminum grandiflorum
dried herb (Himalaya)



Jateorhiza palmata root



Juglans regia shell (Himalaya)



Kaempferia galanga fruit (Hamdard)



Lactuca serriola seed (Himalaya)



Lavandula stoechas flower (Hamdard)



Lens culinaris seed (Himalaya)



Leonurus cardiaca seed (Hamdard)



Leptadenia reticulata stem (Himalaya)



Linum usitatissimum seed (Himalaya)



Malus pumila dried herb (Himalaya)



Mangifera indica bark (Dabur)



Marsdenia tenacissima root (WHO/PLIM)



Martynia annua fruit (Dabur)



Mentha arvensis dried plant (Himalaya)



Mesua ferrea anthers (Dabur)



Michelia champaca bark, stem (CCRAS)



Mimosa pudica dried herb (Himalaya)



Mimusops elengi
plant parts (CCRAS)



Moringa pterygosperma seed (Himalaya)



Mucuna pruriens seed (Hamdard)



Murraya koenigii dried herb (Himalaya)



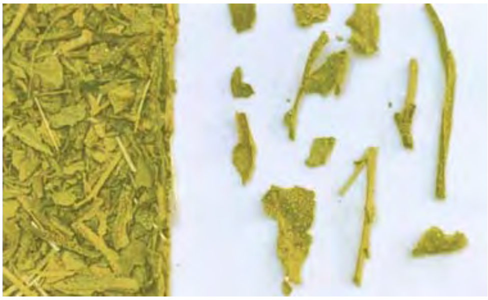
Myristica fragrans aril/nut (Himalaya)



Nardostachys jatamansi rhizome (Dabur)



Nelumbium speciosum
dried herb (Himalaya)



Onosma bracteatum dried plant (Himalaya)



Operculina turpethum root (Dabur)



Orchis latifolia root (Hamdard)



Pandanus tectorius root (WHO/PLIM)



Parmelia perlata lichen (Himalaya)



Pastinaca secacul root (Hamdard)



Phyllanthus fraternus
dried herb (WHO/PLIM)



Picrorhiza kurroa root (WHO/PLIM)



Piper cubeba fruit (Dabur)



Piper longum fruit (Dabur)



Piper longum stem (Dabur)



Piper nigrum fruit (Hamdard)



Pistacia integerrima galls (Dabur)



Pluchea lanceolata leaf (Dabur)



Plumbago zeylanica root (Dabur)



Polygonum bistorata root stock (Hamdard)



Polypodium vulgare rhizome (Hamdard)



Pongamia pinnata plant parts (CCRAS)



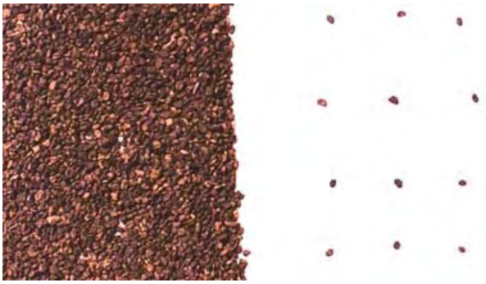
Premna integrifolia stem (Dabur)



Prunus amygdalus kernel (Himalaya)



Prunus armeniaca kernel (Himalaya)



Psoralea corylifolia seed (Himalaya)



Pterocarpus marsupium
heartwood (WHO/PLIM)



Pterocarpus santalinus heartwood (Dabur)



Punica granatum dried skin (Himalaya)



Punica granatum flower (Hamard)



Quercus infectoria gall (Hamdard)



Randia dumetorum fruit (WHO/PLIM)



Raphanus sativus seed (Himalaya)



Rauvolfia serpentina root (Himalaya)



Rheum emodi
knotted aerial parts (WHO/PLIM)



Rheum emodi exudate lump (WHO/PLIM)



Ricinus communis seed (Himalaya)



Rosa damascena dried flower (Hamdard)



Rosmarinus officinalis
dried herb (Himalaya)



Rubia cordifolia stem (Himalaya)



Santalum album heartwood



Sapindus mukorossi seed (Dabur)



Saraca asoca bark (Himalaya)



Saussurea lappa root (Himalaya)



Saxifraga ligulata rhizome (Himalaya)



Scirpus kysoor rhizome (WHO/PLIM)



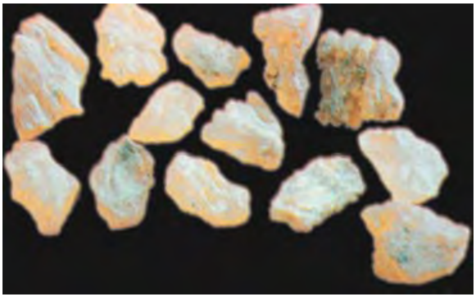
Selinum candollei rhizome (WHO/PLIM)



Semecarpus anacardium fruit (WHO/PLIM)



Sesamum indicum seed (Himalaya)



Shorea robusta gum (WHO/PLIM)



Sida cordifolia dried herb (Himalaya)



Smilax aristolochaefolia root stock (Hamdard)



Solanum nigrum berries (Hamdard)



Solanum surattense dried herb (WHO/PLIM)



Sphaeranthus indicus flower (Hamdard)



Strychnos nux-vomica seed (Dabur)



Strychnos potatorum seed (WHO/PLIM)



Swertia chirayita dried herb (Hamdard)



Symplocos racemosa bark (Himalaya)



Syzygium aromaticum
flower bud (WHO/PLIM)



Tecomella undulata bark (Himalaya)



Tectona grandis fruit (Himalaya)



Terminalia arjuna bark (Dabur)



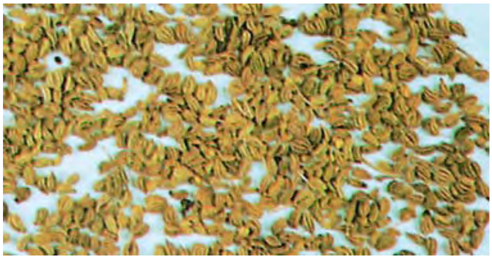
Terminalia bellirica seeds (CCRAS)



Terminalia chebula yellow var.
fruit (Hamdard)



Tinospora cordifolia plant parts (CCRAS)



Trachyspermum ammi fruit (WHO/PLIM)



Tribulus terrestris fruit (WHO/PLIM)



Trigonella foenum-graecum
fruit (Himalaya)



Triticum sativum seed (Himalaya)



Urtica dioica dried root



Valeriana wallichii leaf/rhizome (CCRAS/PLIM)



Verbena officinalis dried herb



Vetiveria zizanioides dried grass (Himalaya)



Viburnum prunifolium dried herb



Viola odorata flower (Hamdard)



Vitex agnus-castus dried berries



Vitis vinifera dried fruit



Withania ashwagandha root (Hamdard)



Woodfordia fruticosa dried flower (Dabur)



Wrightia tinctoria bark (Himalaya)



Yucca recurvifolia plant



Zingiber officinale
dried rhizome (Hamdard)



Zizyphus jujuba Mill.—fruit (Hamdard)

Acknowledgements

CCRAS: courtesy of Central Council for Research in Ayurveda and Siddha, New Delhi

CCRUM: courtesy of Central Council for Research in Unani Medicine, New Delhi

Dabur: courtesy of V.C. Burman, Chairman, Dabur India Ltd., Kaushambi, Ghaziabad-201010. U.P. www.dabur.com

Hamdard: courtesy of Hammad Ahmed, Senior Director, Hamdard (Wakf) Laboratories, 2A/3, Asaf Ali Road, Hamdard Building, New Delhi-110 002. www.hamdard.com

Himalaya: courtesy of Dr. S.K. Mitra M.D., Executive Director, The Himalaya Drug Company, Makali, Bangalore-562123. www.himalayahealthcare.com

WHO and PLIM: grateful acknowledgement to the World Health Organization and Pharmaceutical Laboratory of Indian Medicine, III-A, C.G.O. Complex-I, Kamla Nehru Nagar, Ghaziabad-2010002. Reproduced from R.U. Ahmad et al. (eds) Plant Drugs of Ayurvedic Pharmacopoeia of India, Vol. I, 2001; Album of Crude Drugs; Production of ISM Drugs with Current Good Manufacturing Practice, 2002. Photographs by S.N. Dhusia

WOI: courtesy of The Wealth of India, CSIR